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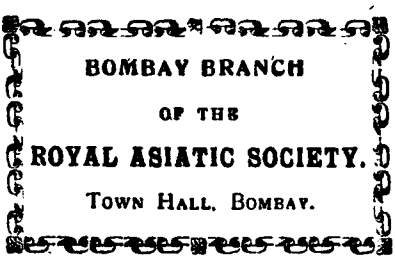

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THE OXFORD SURVEY OF THE BRITISH EMPIRE

VOLUME II

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Native and Protected States are coloured Yellow

INDIA—NORTH-WEST SECTION.

INDIA - SOUTHERN SECTION.

THE OXFORD SURVEY OF THE BRITISH EMPIRE

ASIA

16 40

INCLUDING THE INDIAN EMPIRE AND DEPENDENCIES, CEYLON, BRITISH MALAYA & FAR EASTERN POSSESSIONS

With 34 Photographs, 5 Coloured Maps, and 19 Figures in text

Edited by

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PREFACE

THE object of this series is to furnish a survey of the British Empire and its constituent parts in their geographical and allied aspects, together with their economic, administrative, and social conditions, at the present time. History has not been included as an integral part of the scheme, except for the inclusion of a general historical summary in the General Volume; for the rest, historical references have been included only in so far as they were found desirable for the explanation of existing conditions. The history of the Empire has been brought under review elsewhere, notably in the Oxford *Historical Geography*, edited by Sir Charles Lucas.

The series is in six volumes, and the subject-matter is thus distributed:

I. The British Isles and Mediterranean territories (Gibraltar, Malta, Cyprus).
II. Asiatic territories.
III. African territories (with adjacent islands, Mauritius, &c., St. Helena, Ascension, and Tristan da Cunha).
IV. American territories (with the Falkland Islands and dependencies).
V. Australasian territories (including islands in the Pacific Ocean and the British sector in Antarctica).
VI. General.

The Editors have been in close consultation throughout as to the general plan and details of the work. They have shared between them the arrangements with the contributors, for whose collaboration they express their thanks. Professor Herbertson has undertaken the major part of the work connected with the maps; Mr. Howarth has carried out the greater part of the editorial work in its later stages, has dealt with the illustrations (in the five topographical volumes), and has seen the volumes through the press.

It is desired to acknowledge Mrs. Howarth's collaboration in the work of indexing, and Mr. O. Brilliant's assistance in the compilation of the gazetteer references in the topographical volumes.

Notes in the text enclosed in square brackets are editorial.

CONTENTS

INDIA

CHAPTER		PAGE
I.	PHYSICAL GEOGRAPHY AND GEOLOGY . . By R. D. Oldham, F.R.S., formerly of the Geological Survey of India.	1
II.	CLIMATE AND WEATHER . . . . . By Gilbert T. Walker, M.A., Sc.D., F.R.S., Director-General of Indian Observatories, and Rai Bahadur Hem Raj.	41
III.	VEGETATION, FORESTRY, AND FAUNA . . By Sir Sainthill Eardley-Wilmot, K.C.I.E., formerly Inspector-General of Forests.	76
IV.	AGRICULTURE . . . . . By J. S. Cotton, M.A., Editor of the *Imperial Gazetteer of India.*	113
V.	INDUSTRIAL AND ECONOMIC CONDITIONS . . By J. S. Cotton, M.A., Editor of the *Imperial Gazetteer of India.*	138
VI.	LANGUAGES, CUSTOMS, AND RELIGIONS . . By T. C. Hodson, Hon. Secretary of the Royal Anthropological Institute, formerly of the Indian Civil Service.	181
VII.	POLITICAL GEOGRAPHY, GOVERNMENT, AND ADMINISTRATION . . . . . By Vincent A. Smith, M.A., formerly of the Indian Civil Service, and Deputy Reader in Indian History in the University of Oxford.	242
VIII.	WESTERN INFLUENCE . . . . . By Sir Richard C. Temple, Bart., C.I.E., Indian Army, retired.	296
IX.	THE MALDIVE AND LACCADIVE ARCHIPELAGOS By J. Stanley Gardiner, M.A., F.R.S., Professor of Zoology and Comparative Anatomy in the University of Cambridge.	314

CHAPTER PAGE

X. SOUTHERN ARABIA AND ADEN 329
By J. Stanley Gardiner, M.A., F.R.S., Professor of Zoology and Comparative Anatomy in the University of Cambridge.

OTHER POSSESSIONS

XI. CEYLON 338
By J. C. Willis, M.A., Sc.D., formerly Director of the Royal Botanic Gardens, Peradeniya.

XII. BRITISH POSSESSIONS IN THE MALAY PENINSULA, &C. 371
By W. A. Graham, formerly Resident Commissioner at Kelantan.

XIII. BRITISH BORNEO 415
By William McDougall, M.A., F.R.S., joint author of *The Pagan Tribes of Borneo*; Wilde Reader in Mental Philosophy in the University of Oxford.

XIV. CHRISTMAS AND COCOS-KEELING ISLANDS . 435
By J. Stanley Gardiner, M.A., F.R.S., Professor of Zoology and Comparative Anatomy in the University of Cambridge.

XV. HONG KONG 439
By O. J. R. Howarth, M.A., Assistant Secretary of the British Association, joint-Editor.

XVI. WEI-HAI-WEI 448
By O. J R. Howarth, M.A., Assistant Secretary of the British Association, joint-Editor.

GAZETTEER OF TOWNS 454

STATISTICS 463
By Harold Macfarlane, F.S.S.

APPENDIX: INDIAN RAINFALL 487

INDEX 493

LIST OF PLATES

PLATE		FACING PAGE
I.	Khaibar Pass, India	18
II.	(*a*) Chappar Rift, Sulaiman Mountains, India	19
	(*b*) Mount Abu Lake, India	19
III.	The Himalayas from Darjiling	24
IV.	Dall Lake, Kashmir	25
V.	Kudan, Kashmir	50
VI.	Malapuram, Madras	51
VII.	The Sundarbans, India	78
VIII.	Gudulur, Madras	79
IX.	Parbatti Valley, North India	126
X.	Talkatora Tank, Jaipur, India	127
XI.	River Scene in Burma	288
XII.	(*a*) Katha, Burma	289
	(*b*) Pagan, Burma	289
XIII.	Chief Street in Malé, Maldive Islands	315
XIV.	Turadu, Maldive Islands	328
XV.	(*a*) Salt-pans, Aden	329
	(*b*) Devon Falls, Ceylon	329
XVI.	Tree-ferns, Hakgalla, Ceylon	370
XVII.	Singapore, Chinese buildings	371
XVIII.	Botanic Gardens, Singapore	384
XIX.	Botanic Gardens, Singapore	385
XX.	(*a*) Taiping Lake, Perak	400
	(*b*) Raub Village, Pahang	400
XXI.	Rice-fields and coco-nut trees, Pahang	401
XXII.	A Jungle Scene in the Malay Peninsula	414
XXIII.	A River Scene in the Malay Peninsula	415
XXIV.	Bruni	424
XXV.	Mouth of River Abai, Bruni	425
XXVI.	Sembiling River, Bruni	434
XXVII.	(*a*) Shaukiwan, Hong Kong	*435*
	(*b*) Lyeemun Channel, Hong Kong	*435*
XXVIII.	Stanley, Hong Kong	*448*
XXIX.	Port Edward, Wei-hai-wei	*449*

The names of the authorities or individuals who have supplied photographs are stated on each plate. The Editors desire to express their thanks, for the loan of photographs, to the *Visual Instruction* Committee of the Colonial Office, Mr. T. H. Reid, of the *Malay* States Information Agency, and Prof. J. Stanley Gardiner. They have also to thank Sir Charles Lucas for valuable [redacted]

COLOURED MAPS

India, South . . . . . *Beginning of vol.*
India, North-East . . . . . „ „
India, North-West . . . . . „ „
India, Bathy-orographical . . . . . *Pages* 40–1
India, Geological . . . . . „ „

MAPS AND DIAGRAMS IN TEXT

India

FIG. PAGE
1. Seasonal temperature 42
2. Mean annual rainfall 44
3. Seasonal rainfall 46
4. Seasonal pressure and winds 48
5. Vegetation 77
6. Soil 125
7. Irrigation 125
8. Economic minerals 142
9. Distribution of population 180
10. Prevailing races 182
11. Languages 183
12. Religions 219

Other Possessions

13. The Maldive Archipelago 314
14. Ceylon 340
15. British Malaya 372
16. Isotherms, South-Eastern Asia, &c. 376
17. Isobars, Winds, and Rainfall, South-Eastern Asia . . 378
18. Hong Kong 440
19. Wei-hai-wei 449

INDIA

CHAPTER I

PHYSICAL GEOGRAPHY AND GEOLOGY

By R. D. Oldham

Geographical division.

The Empire of India comprises, and is almost entirely comprised by, two distinct geographical unities. One of these may be regarded as India proper, bounded on the north by the great range of the Himalayas, on the west by the mountains of Afghanistan and Baluchistan, and on the east by a complex of hills, which runs southwards into the Arakan Yoma and forms the western boundary of the eastern province, known as Burma. Here again we have a distinct geographical unity, almost coincident in its limits with the drainage area of the Irawadi river, and bounded on the east by the mountain plateau of the Shan States.

Each of these two areas possesses an individuality, and presents so many differences in geological history and existing features—differences which are reflected in a strong contrast of vegetation, of ethnology, of history, and administration—that it will be convenient to treat them separately.

India proper may be divided into three parts, each having great variety of climate and aspect, but each preserving throughout these variations a certain unity, and at the same time a certain distinctness from the others. These parts are firstly, the Peninsula; secondly, the great alluvial plains of the Indus and the Ganges Rivers; and thirdly, the mountain ranges fringing the Gangetic plain on the west, north, and east.

The Peninsula.

The Peninsula of India is one of the oldest land areas of the world. From a very ancient period of geological history it has never been submerged beneath the sea which forms its boundary on either side. Broadly speak-

ing, it is a region of open valleys and easy slopes, in which rivers flow with gentle gradients. Locally there may be steeply scarped hills cut by narrow steep-sided valleys, or sharp-crested ridges may rise from the plain, and great granite tors and bosses are found in certain regions; but, striking as these may be, they do not alter the general truth of the statement that the Peninsula is a region of open valleys and gentle slopes, from which true mountain ranges are absent.

Moun tains.

The mountain ranges of the Peninsula, so called, are almost without exception the scarped edges of more or less elevated plateaux, but some of these are extensive and lofty enough to deserve special names and description. Their nomenclature presents many difficulties, as it is a rare exception for a name to be applied by the people of the country to any range throughout its length. Peaks and passes often have well-established names, but the ranges have none, and where any general term exists its application is usually so vague that it becomes useless for geographical purposes unless some conventional restriction is adopted. Thus the name Vindhya, which is now usually restricted to the hills north of the Narbada valley, formerly applied generally to the hills separating Hindustan proper, or the Gangetic country, from the Deccan or southern country, and included what are now called the Satpura hills, if, indeed, these latter were not more particularly those indicated by the name.

Western Ghats.

The most conspicuous and important of the so-called mountain ranges of the Peninsula is that known as the Sahyadri or Western Ghats, which runs parallel to the western coast, but set back by an intervening tract of lowlands. It forms an imposing scarp and barrier, through which access may be had to the uplands behind through certain passes, or *ghats*, which have given rise to the term generally applied to the range as a whole. Running parallel to the coast throughout its length, interrupted only by the Palghat gap in the Coimbatore district, the range presents a general similarity to an upraised sea cliff, yet, although there is good reason to

suppose that the sea once washed its foot, it is very doubtful whether this is the correct explanation of the origin of the Western Ghats. Their surface features, regarded in detail, are not those due to marine action, but those produced by rain and rivers. Here alone in peninsular India do we find the stream valleys deep, narrow, and steep-sided, or the streams still actively engaged in deepening and cutting back the heads of the valleys, showing that the region has undergone an uplift so recent that the drainage has not yet had time to adjust itself to the altered conditions. The study of the geology of India shows that the land area formerly extended far beyond the western coast, as a continuous barrier to the continent of Africa, and the break-up of this land connexion took place at a very late stage in the earth's history. The west coast of India is shown by its general straightness to be due to movements of subsidence on the one hand, or elevation on the other, of a line close by the present course of the coast, and the scarp of the Western Ghats, running as it does parallel with this, appears to have been produced by the same series of earth movements.

Eastern Ghats.

The eastern face of the Peninsula presents much less simplicity than the western; though holding a general course, unbroken by any long projections or deep indentations, it is of a complex nature, the rocky coast-line being interrupted by a series of deltas of the rivers draining the interior of the Peninsula. Between the deltas is a tract of lowland, much as on the west, and behind this there is an abrupt rise of the ground-level, somewhat similar to the Western Ghats, though on a smaller scale, which gives rise to the feature sometimes known as the Eastern Ghats. These, however, have neither the importance nor the continuity of the Sahyadri scarp, being breached by a succession of river valleys, and the application of a general name seems to have as little justification as the customary representation, on maps, of a distinct range of mountains.

Southern Mountains.

Mention must be made of the mountains of southern India, of which the best known are the Nilghiri, or blue

mountains, on which the summer capital of the Madras Government is situated at Ootacamund. South of the Palghat River is the very similar group of the Anamalai, and farther east the smaller group of the Shevaroy, both of which, besides some smaller groups, as also the Nilghiris, have the same character of elevated plateaus, showing all the features of an ancient land surface not differing materially in character from the surrounding lowlands. Round the edge of the plateau the ground drops steeply down, and here deeply-cut valleys may be met with: but the uplift of the hills has been so recent that the valleys have not been cut back to any great extent.

Satpura, Vindhya.

In the northern part of the Peninsula we have the Satpura hills, lying between the Tapti and the Narbada Rivers. Though these must be regarded as a range for the purpose of cartography, this has no structural individuality, and is merely the remnant of high ground left standing between the two parallel valleys on either side. To the north of the Narbada comes another range, known as the Vindhya, which is a true escarpment, marking the boundary of the Vindhyan plateau, composed of ancient sandstones and shales. The Vindhya scarp is continuous along the north side of the Narbada valley and continued eastwards by a similar scarp on the north of the valley of the Son. Geographically and geologically these hills are the continuation of the Vindhya and should bear the same name, but in the Son valley region they are more commonly known as the Kaimur (Kymore) hills.

Aravali.

The last of the hill ranges of the peninsular area, sufficiently important to deserve special notice, is of a different character from those which have previously been mentioned, and is not, like them, a one-sided scarp. So far as geological structure is concerned the Aravali range, which runs southwards from Delhi, is a true mountain range, in which the rocks have been highly compressed and folded, but even here the range is very old, and the hills, as they now exist, owe nothing to the

original uplift of the range; they are, in fact, merely the stumps of the old mountains, which have been worn down by weathering till there remains but a complex of ridges, more or less parallel to each other, formed of the harder and more resistent rocks, left standing when the softer or more easily disintegrated rocks have crumbled and been washed away by the streams.

Rivers. The rivers of the Peninsula may be divided into two main groups, excluding those that drain into the Ganges: the first comprises the Narbada and the Tapti, which flow westwards into the Gulf of Cambay and drain a considerable portion of the centre of the peninsular area; and the second, comprising the Mahanadi, Godavari, Kistna, Penner, and Cauvery, which flow eastwards to the Bay of Bengal. The four of these last named carry practically the whole of the drainage of the southern half of the Peninsula. Only small and insignificant streams flow westwards from the Ghats; no river of any importance breaks through them south of the Tapti, but from their crest, within sight of the sea, the four great deltaic rivers carry nearly the whole drainage, right across the breadth of the Peninsula, to the eastern coast.

Drainage of the Peninsula. This easterly trend of the peninsular drainage is probably of very ancient date, for while the occurrence of patches of littoral marine deposits, of Cretaceous and Jurassic age, along the east coast shows that, even as far back as this period, the limit between land and sea was not far different from the present coast-line, it is well established that dry land must have extended, on the west, over what is now the Indian Ocean, up to the beginning of the tertiary era at earliest; and the very peculiar arrangement of the peninsular drainage is most probably explained by the upper parts of much more extensive drainage basins having been cut off by the earth movements which gave rise to the range of the Western Ghats.

Narbada and Tapti. The valleys of the Narbada and Tapti are marked by extensive alluvial plains; that of the Narbada extends from a little east of Jabalpur to Harda, a distance of

more than 200 miles, varies from 12 to 35 miles in breadth, and is known to have a depth of at least 500 ft. at Gadawara; in the Tapti the alluvial plain has a length of over 150 miles and a breadth of as much as 30, the easterly termination being close to Barhanpur, and another alluvial plain of about 100 miles long by 40 miles broad extends westwards from near Amraoti in the valley of the Purna, a tributary of the Tapti. In the easterly flowing rivers there are no such broad and well-defined alluvial plains, though there are numerous and extensive alluvial flats, far inferior, however, to those of the Narbada and Tapti.

Besides the rivers flowing directly to the sea, the northern part of the Peninsula gives rise to rivers which form part of the Gangetic drainage. Of these the Chambal and the Sind drain the area north of the Vindhyas, and the Son, flowing along the foot of the Kaimur extension of the Vindhya scarp, receives tributaries from the south. Farther east the Damuda River drains a considerable area, and unites with the Hooghly effluent of the Ganges before this enters the Bay of Bengal. It is therefore technically a tributary of the Ganges, though its waters never reach the main stream of that river.

Surface features.

The surface features of the Peninsula in certain parts present peculiarities due to the development of particular geological formations, or forms of surface soil, which are either confined to India or not widely distributed outside of it, and therefore deserve special mention.

Deccan traps.

The most extensive of these special areas is that occupied by the Deccan traps, a great series of volcanic lavas and ashes, erupted at the close of the Cretaceous period. Some idea of the extent of these rocks may be formed from the facts that the railway from Bombay to Nagpur, a distance of 519 miles, never leaves the volcanic rocks till close to Nagpur station; that the Bombay coast, for a length of over 300 miles, is formed by them, and that they extend about the same distance northwards along the east of the Aravali hills; while inland they reach as far as Amarkantak, and cover the

greater part of Kathiawar. Altogether, the area occupied by these rocks cannot be less than 200,000 square miles. Throughout this area the beds lie nearly flat, and the geological structure has impressed on it peculiarities of scenery, widely different from those of other parts of the Peninsula. Great undulating plains are divided from each other by flat-topped, terraced hills, rising in successive steps, separated from each other by precipitous cliffs or steep rocky slopes. The vegetation of the trap area differs no less conspicuously from that which is found on other geological formations, the distinction being most conspicuous in the dry season. The peculiarity consists in the prevalence of long grass and the paucity and small size of the deciduous trees, with the result that the country, cultivated tracts excepted, presents a uniform straw-coloured surface during the cold season, from November to March, whilst from March to June, after the herbage is burnt, the black soil, black rocks, and blackened tree-trunks give it a remarkable aspect of desolation. In June, with the advent of the monsoon rains, the country is covered with verdure, whose bright tints are brought out more conspicuously where they contrast with the blackness of the rocks.

Vindhyan area.

The next special area to be mentioned is that occupied by the Vindhyan formation—sandstones and shales of unknown, but certainly ancient, geological date. The country covered by this formation was formerly larger and more extensive than the present one, as a considerable portion has been covered up and hidden by the Deccan traps; at the present time there are three principal areas of Vindhyan rocks, one in Kotah and Gwalior, the second in Rewah and Panna, and the third, much smaller, in Bhopal. These areas are not wholly detached, being connected by narrow strips where the Vindhyans appear from under the edge of the Deccan traps, and altogether amount to about 40,000 square miles. In general the Vindhyan rocks lie nearly flat, and the hills in the area occupied by them are flat topped with terraced slopes, as in the Deccan trap area; but the general aspect is very

different, the blackness of the trap area is absent and the prevailing colour of the cliffs is red, moreover the forms are more massive and rounded than those yielded by the lava-flows of the Deccan. The sandstones often form thick beds, some of which are unsurpassed as building stone, the excellence and durability of which is attested by the palaces and monuments of the Moguls and their predecessors. Alternating with them are thick bands of shaly rock, which has weathered away to form broad stretches of lowland country. In parts the Vindhyan area is very barren, but large stretches of park-like country are also found, dotted with large trees, no inconsiderable portion being evergreen.

Black cotton soil:

Of superficial deposits two must be specially mentioned, the regur or black cotton soil, and the laterite. Regur, a corruption of the Telugu word *regada*, is often called black cotton soil from its dark colour and its suitability for the culture of cotton, and occupies a large area in the Peninsula. In its most characteristic form it is fine-grained and coloured, varying considerably in colour and fertility, but always highly argillaceous, and calcareous. In wet weather it turns to a sticky unctuous mud, and in dry weather it is seamed with broad and deep cracks, often half a foot in width and many feet in depth. Generally it is full of rounded concretions, cemented by carbonate of lime, which may be washed out to form a sort of sand or shingle in the stream-beds, but true pebbles are remarkable for their absence. Where uncultivated the regur plains usually form great prairie-like expanses of grass, in which trees are only sparingly found; but, as in the prairies of North America, this is probably due to the growth of grass having been promoted, and the trees gradually killed off, by the practice of annually burning the vegetation, at the beginning of each dry season. Very large tracts are cultivated and of remarkable fertility; some of the plains of Malwa are believed to have been cropped continuously for over 2,000 years without irrigation, without manure, and without fallow.

The origin of regur is a doubtful question. It is found principally on the Deccan traps, and, as it occupies nearly the whole of the culturable land in the area covered by this formation, has been supposed to be due to decomposition of volcanic rocks; but there are areas scattered over Southern India and in Kathiawar occupied by similar soil, yet underlaid by very different rocks, which are extensive enough to render this explanation very doubtful. The dark coloration was attributed by earlier writers to vegetable matter, and taken to indicate a large amount of humus in the soil; more recent investigations make this doubtful, and in all probability the colour is due to mineral constitution, rather than to the very scanty organic constituents of the soil. In its distribution and constitution, and in forming broad undulating plains, which have a very considerable variation of level with nothing but long and gentle slopes, it resembles the loess plains of China, the prairies of America, and the steppes of Central Asia, and, like the surface deposits of these areas, is very likely formed of wind-borne dust. Its origin.

Another special form of surface deposit or soil is laterite, a name which was originated in India by Buchanan Hamilton for a substance which was long believed to be peculiar to India but is now known to have a widespread occurrence in the tropical and subtropical regions of the world. The name has been frequently misapplied to any red surface-soil or decomposed rock, but strictly speaking the red colour, though almost universal, is not essential. The colour is due to oxide of iron, at times sufficiently abundant to enable the rock to be used as an iron ore, and the general presence of this constituent led earlier observers to regard it as an essential character; later observations, however, seem to show that the special character which distinguishes laterite from other forms of red-coloured weathering is the presence of hydrous oxide of alumina in varying proportions. Laterite:

Strictly speaking, laterite is a porous, clayey rock, which cuts easily when first quarried, but hardens greatly Its character:

on exposure, a character which makes it very useful as a rough building material. The exposed natural surface is peculiar, being irregular, pitted with small hollows, penetrated with tortuous tubes and cavities, and covered with a brown glaze of limonite; these characters give therock a remarkably scoriaceous appearance, and have led to its being wrongly regarded as a volcanic rock. The surface of the more solid forms of laterite is usually very barren, principally on account of the rock being so porous that all water sinks into it, with the result that the laterite plateaus are usually bare of soil and frequently bare of vegetation. Only in the hollows, where soil can accumulate and fill the pores of the laterite, can vegetation thrive.

Its distribution.

The distribution of laterite is extensive throughout southern India and as far north as about 24° N. lat. Very commonly it forms a cap on the top of the hills, of 10 to 40 and even 100 feet in thickness, but this may be largely due to the fact that the absence of joints in the rock and its porosity, which allows the rain to soak in and so prevents the formation of surface streams, combine to render it singularly resistant of denudation, so that the areas covered by it tend to be left standing out as hills by the removal of the less-protected rock around. This, however, is probably not the whole explanation, for the laterite caps are confined to flat-topped hills, and the rock is only met with where the surface is nearly flat or gently undulating, and is absent where the surface is more distinctly hilly. Though there is still a great deal of uncertainty about the way in which laterite was formed, the facts which are known of its distribution seem to show that it is a distinct form of weathering, which is confined to low latitudes and humid climates; its formation seems to have been a slow process, only possible on flat or nearly flat surfaces, where surface rain-wash could not act.

The Indian Desert:

Westward of the Aravali hills lies a tract which cannot be included with either peninsular or extra-peninsular India, but partakes to some extent of the character of

both areas. So far as the rocks are concerned, it belongs to the latter rather than the former area, but in structure it belongs to the Peninsula. The scanty rainfall has given it the name of desert, and in part it deserves the name in every respect, but a large portion of it is populated in scattered villages and towns, yields abundant crops in a favourable season, and supports large herds of cattle, sheep, and camels.

In Sind.

The aspect of the desert varies considerably in different parts. In the south-west, towards Sind, it is a sea of sand-hills, stretching in long parallel lines, rising steeply on either side, and separated by narrow troughs; these hills present the peculiarity that the ridges are ranged in a west-south-west and east-north-east direction, parallel to the direction of the prevailing wind. Not infrequently considerable tracts are bare of any vegetation and composed of loose, shifting sand, but more usually the surface is covered by a growth of wiry grass and low shrubs, with larger bushes and small trees, growing in the hollows and patches of silty soil found among the sand-hills.

In Jesalmir and Bikanir.

Further east and north-east, in Jesalmir and Bikanir, large expanses of rock are found, cropping out from expanses of sand and silt, dotted at long intervals by salt lakes, some permanent but more drying up every year. Sand-hills are found, rising two and three hundred feet above the plain, but these are of the more usual type, whose crest is ranged transverse to the general course of the wind, with a long gentle slope on the windward and a steep slope on the leeward side. Here too are found villages and towns, many presenting an aspect of former prosperity, greater than at present, and water is obtained from wells commonly 200 to 300 feet in depth, which have been dug at great expenditure of time and labour through the solid rock. It is doubtful how far the evidences of formerly greater wealth, to be found throughout the inhabited portion of the desert, are due to a climatic change which has rendered the country more arid than of old, or how far to the fact that, in the troublous times which preceded British rule, this desert tract

formed the refuge of the great banking and trading houses of India, where Rajput honour and Rajput valour combined with the difficulty of access to afford them protection from the varied exactions of the parties contending with each other for sovereignty or plunder.

The Runn of Cutch.

Rivers are naturally wanting in this desert tract, but one there is, the Luni, which, for most of the year and most of its course, disappears under the sands of its bed, to reappear at intervals and flow for a while as a shallow, brackish stream which ultimately reaches the Runn of Cutch, an immense tract of barren salt marsh, periodically overflowed by salt water. Lying to the north of Cutch and Kathiawar, stretching for 200 miles from east to west, and in places nearly 100 from north to south, the Runn is for the most part of the year a broad, barren plain of sun-baked mud, but when the south-west monsoon raises the level of the Arabian Sea and dams back the water brought down by the rivers which drain on to the flat, it becomes covered, from July to November, with a sea of brackish water. At this time portions of the Runn may be as much as seven feet under water, but the average depth does not exceed five feet.

The Indo-Gangetic Plain:

North of the Peninsula, the great alluvial plain of the Indus, Ganges, and Brahmaputra Rivers covers an area of about 300,000 square miles, and stretches, with a width from 90 to nearly 300 miles, from sea to sea. This plain comprises the richest and most populous portion of India, including the greater part of the provinces known as Assam, Bengal, Bihar, the United Provinces of Agra and Oudh, the Puñjab, and Sind, and in its north-western portion forms the region to which, strictly speaking, the name of India belongs. The aspect of this region varies from the arid, sun-baked plains of the Punjab to the reeking forests of Assam and the swamps of the Gangetic delta, but the general effect throughout is that of flatness, unbroken except where there is a sudden drop from the upland plain to the lower level near the streams; and over the whole of this area the soil is uniformly fine-grained, sometimes almost pure sand, at others almost

equally pure clay, and, except near the margins and within 20 miles, at the outside, from the hills, not even the smallest pebble can be found. To make up for this absence, calcareous concretions are found in many parts, occasionally in the form of regular beds of limestone, but more usually as small nodules, hard and compact within and soft without, known as *kankar*, which are largely used as a source of lime and also for road-metal, forming an excellent, if somewhat dusty, surface, where the road has not to carry very heavy traffic.

Origin and character.

A general idea, at one time more universally held than at present, is that this plain was formerly an arm of the sea, but there is no geological evidence in favour of this view, and many facts tell against it. It is more probable that the whole of these alluvial deposits were formed on dry land, by the rivers which now flow over them, in circumstances generally similar though in some respects different from the present. This is shown by the distinction which is generally found between the upland plain and the lowland strath, known respectively as *bhángar* and *khádar*, throughout the area of the Gangetic drainage, above the region of the delta. The former of these, the *bhángar*, represents the general surface of the plain, as it was left by the streams, before a change of conditions led to a cessation of deposit and the commencement of erosion; the *khádar*, on the other hand, is the lowland plain which has been cut out of the alluvium by the rivers as they meandered to and fro, cutting away their banks, first on one side and then on the other.

Punjab.

In the Punjab this distinction, which in the Gangetic area may mean a difference of level of as much as 200 feet, is hardly noticeable, and this difference may be due to changes in the course of the drainage which have certainly taken place. The summit-level of the plain, in the lowest part of the watershed between the Indus and the Ganges, is about 925 feet above the sea; but the plain is continuous between the two drainage areas, there is no ridge of high ground, and a very trifling change of level might cause the affluents of one river to flow into the other.

The fact that the same species of fresh-water dolphin is found in the two river systems shows that they must once have been in communication with each other, and there is some geological ground for believing that a large part, if not the whole, of the waters of the Ganges and Brahmaputra Rivers once joined the Indus and flowed into the Arabian Gulf, before the gap, by which they now reach the Bay of Bengal, was formed. It is very probable that part of the change has taken place in historic times, and that the river now known as the Jumna formerly flowed to the Indus and was known as the Saraswati in Vedic times.

The Delta: In the region of the Delta the distinction between *khádar* and *bhángar* is lost, and there the rivers assume the normal deltaic form of a channel bordered by high banks, from which the ground slopes away to swamps and meres. The delta of the Indus is small in comparison with that of the Ganges, moreover the limit of the delta proper is much better defined and the form more closely approaches a triangle than that of the Ganges, where a number of causes, into which it is not possible to enter here, and which are still very imperfectly understood, have caused the distinction between the delta and the region above the delta to be ill defined.

On its seaward face the Gangetic delta merges into the Bay of Bengal by a network of creeks and channels, separating low islands, barely rising above the level of high tide and covered in parts with a dense, almost impenetrable jungle, in others by a savannah-like growth of tall grass dotted with trees. This tiger-infested and fever-haunted country, known as the *Sundarbans*, from one of the most abundant and characteristic of the trees which grow in it, is almost uninhabited, and, in the parts most recently formed, will probably not become habitable till the accretion of silt has raised the surface of the soil; but on its landward side it is slowly losing its peculiar character and being reclaimed to cultivation and population.

Northern and Southern boundaries.

The northern and the southern boundaries of the plain differ very markedly in character. On the south the rocks of the Peninsula pass gradually under the alluvium; the boundary between the two is very tortuous in its course, following all the minor irregularities of the old land surface on which the alluvium was deposited, and for some distance out numerous hills and knobs of rock rise in the midst of the alluvium, getting gradually smaller and more scattered as the thickness of the alluvium increases over the shelving rock surface on which it rests. On the north the foot-hills of the Himalayas rise abruptly from the plain in a continuous ridge, with none of the outlying hills and hillocks which fringe the southern boundary.

This contrast is closely connected with the past history of the plain. On the south it has gradually encroached on a slowly sinking land surface; on the north the hills immediately along the edge of the plain are formed of deposits which were once part of the plain itself, and have been disturbed and uplifted in the process of formation of the mountain range. This contrast is not confined to the region north of the Peninsula; it is equally to be met with along the eastern and western sides of the alluvial plain of the Indus, and is to be observed also in the tongues of the principal area, which extend eastwards up the valleys of the Brahmaputra and Barak Rivers. Here the Assam range of hills, separating the two valleys, simulates the Peninsula on its northern margin, where it forms the southern limit of the Brahmaputra valley, and rises as abruptly, on its southern side, from the plain of the Barak valley as the Himalayas along the northern margin of the principal area of the alluvial plains.

The Bhābar.

Fringing the Himalayas, where they rise from the plains, a sloping surface of gravel, brought down and deposited by the streams and rivers which drain from the hills, is found almost along the whole of their length. This gravel slope is locally known by various names, of which *bhābar*, the term prevalent in Kumaon and Garhwal, is most commonly used in English, and on this slope all

streams, except the large rivers, disappear by percolation, with the result that it has become a forest-clad region, with hardly any population or cultivation, except where irrigation is possible.

The Terai.

Beyond the gravel slope, where it merges into the plain, is a region of swamps, caused by the issue of the water, which has percolated underground through the gravel of the *bhābar*; this forms the notorious and dreaded *terai*, a name which is not infrequently extended to the whole forest-clad slope at the base of the Himalayas. In its natural state the swampy nature of the terai renders it very unhealthy, and consequently uninhabitable, but by degrees, with the increase of population, it is being reclaimed, cleared, and brought under cultivation. On the western margin of the Indus plain the terai is wanting, but this is only due to the smallness of the rainfall, for the gravel slope is even more strongly developed than along the Himalayas. Owing to climatic differences no true forest is met with, and the ground is bare or at most clothed with a sparse scrub.

Rivers of the plains.

The two chief rivers of the plains are the Indus and the Ganges, which enter the sea at the western and eastern ends of the strip of alluvium; all the other streams and rivers are, sooner or later, tributaries of one or the other of these two great rivers.

Indus.

From where it issues from its rocky course in the hills the Indus flows in a general south-westerly course, keeping within sight of the western hills, except for a stretch in upper Sind, where a bay of the alluvium stretches westwards, by Shikarpur and Jacobabad, to Sibi; and just opposite this embayment the Indus River presents a singular feature, as it finds its way through a low range of limestone hills, surrounded on all sides by alluvial deposits, which, on both sides, lie at a lower level than that of the river in the gap between Sukken and Rohri.

Throughout this course the Indus receives no important tributary from the west, except the Kabul and Zhob Rivers, which drain large areas in the hills of Afghanistan. On the east it receives the combined waters of the rivers

of the Punjab, but from their junction onwards it flows, like the Nile, without tributary from either side, till the waters split up in the delta, to reach the sea by several channels. Like the Nile, too, it is bordered on either side by a strip of cultivated ground, which owes its fertility to irrigation and inundation from the flood-waters of the Indus, and is bordered on either hand by broad arid tracts, passing at times into true desert.

The Punjab, or Land of Five Rivers, is a triangular area, lying east of the Indus, the five rivers being, in order from west to east, the Jhelum, Chenab, Ravi, Bias, and Sutlej, of which the first and last mentioned are the most important and drain the largest areas within the Himalayas. Between this and the Jumna, the most westerly river of the Gangetic system, some minor streams flow from the hills and are lost in the sands of the desert. The most considerable of these, small as it is, is known by the name of Saraswati, one of the sacred rivers of the Hindus, which is described in the Vedas as a mighty river flowing to the sea. It is difficult to believe that this description could ever have been applied to so inconsiderable a stream as the present Saraswati, or the name applied to the description; a possible explanation may be found in the fact that on the continuation of its present course, and beyond its present termination, the bed of what was once a large river can be traced through the western portion of the desert. This river channel must have been fed by a larger drainage area than that of the Saraswati stream, and must have carried the waters of either the Sutlej or the Jumna Rivers, more probably the latter. The Five Rivers.

The Ganges, like the Indus, hugs one border of the alluvial tract, and after issuing from the hills the drainage of the Himalayas finds its way southwards to the main stream, which flows near the southern margin of the plain, along the northern limit of the peninsular area. It receives a number of important tributaries from the north, and it is doubtless the amount of débris brought down by these from the Himalayas, and deposited on the plain, Ganges.

which has forced the main stream towards the south. The contrast with the absence of tributaries to the Indus is due to the much greater amount of rain that falls on the Himalayas as compared with the ranges west of the Indus.

Brahmaputra.

After leaving the margin of the peninsular rock area, the Ganges flows eastwards till it meets the Brahmaputra River at Goalando, and the two flow southwards to the sea. Here we have historical evidence of a very considerable change in the river course, for it is known that in 1785 the Brahmaputra River was flowing in a channel, which is now no more than a chain of pools in the dry weather, past Mymensingh. There is no record of the events of succeeding years, but somewhere about 1830 the river gradually deserted this course and formed a new one west of an elevated tract of old alluvium, which runs northwards from Dacca. The old course still bears the name of Brahmaputra, and the new one, formed within the last century, is called the Jamuna. Below the junction of the Ganges and the Jamuna the river loses both names, and is known as the Puddah till it receives the waters of the Meghna, the river draining the valley of Cachar, and from thence to the sea is known by the name of its comparatively unimportant tributary. These peculiarities of nomenclature point to even greater changes, than that of which there is definite record, having taken place since the country became inhabited, but there is no documentary record of what these changes were or of when they took place.

The extra-peninsular mountains.

Beyond the Indo-Gangetic alluvial plains rise the mountains of the extra-peninsular portion of the Indian Empire. Though these all belong to the same great period of mountain formation, which marked the Tertiary era and Post-tertiary period of the earth's history, and although they pass into each other in a manner which prevents any precise boundaries being applied to the various ranges, yet they must, whether convenience of description, existing outlines, or past history and structure be taken into consideration, be regarded as belonging

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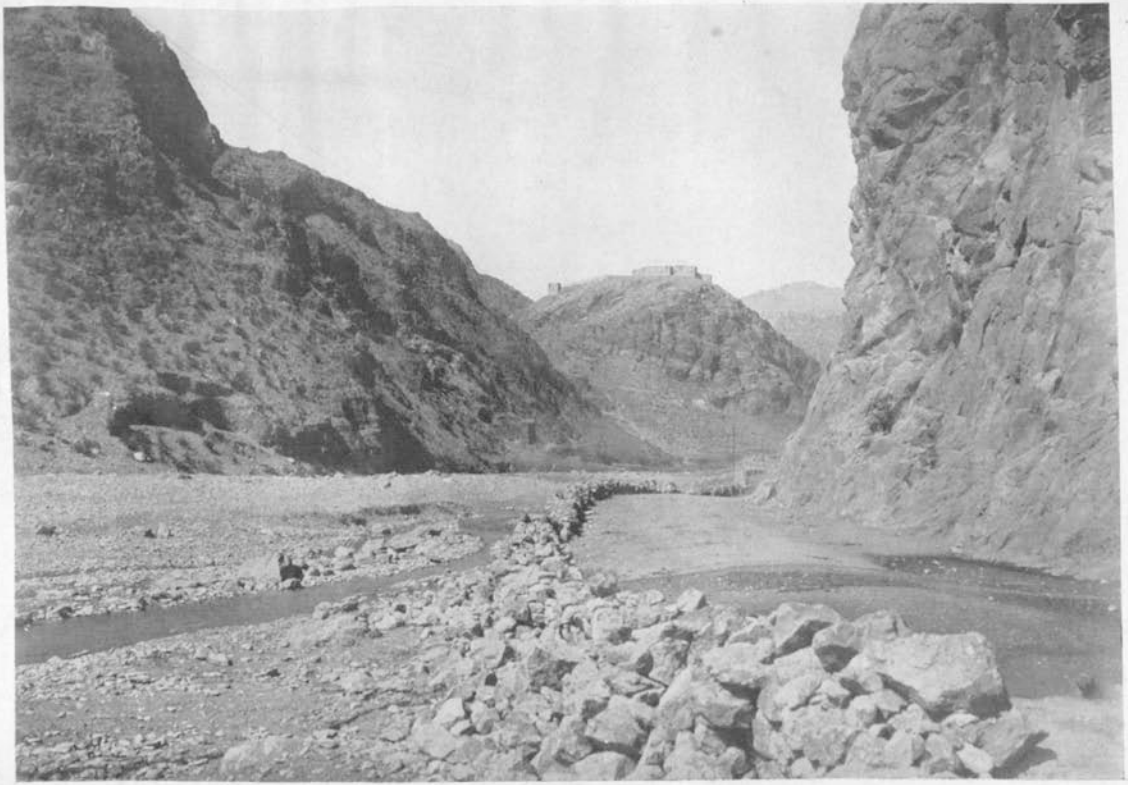

PLATE I. KHAIBAR PASS

(Visual Instruction Committee)

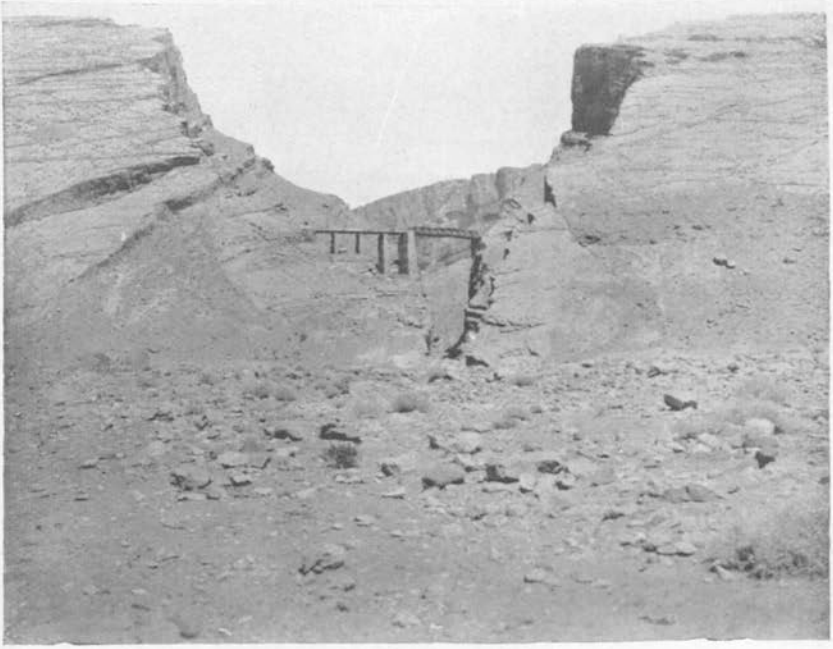

PLATE II (*a*). CHAPPAR RIFT, SULAIMAN MOUNTAINS

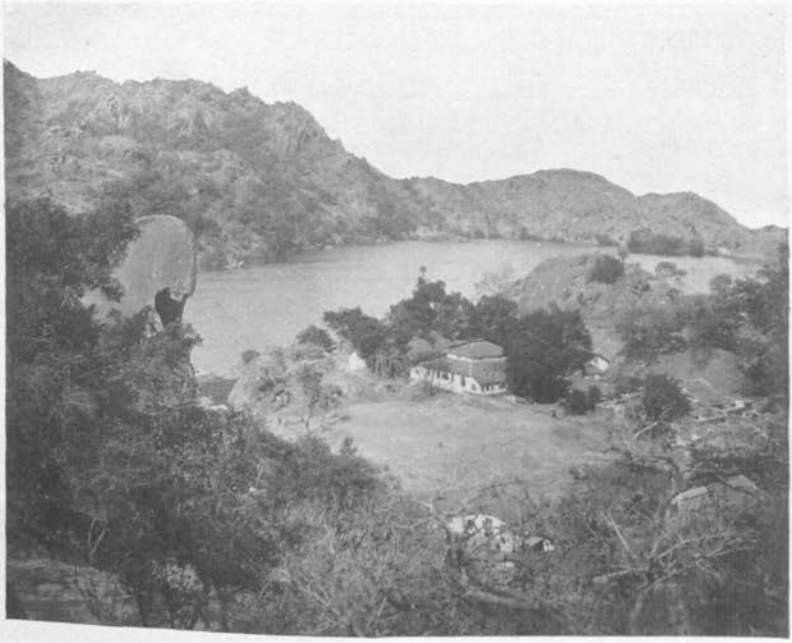

PLATE II (*b*). MOUNT ABU LAKE

(Visual Instruction Committee)

to three distinct systems. These three systems, taken in order from west to east, are, firstly, the complex of mountains rising west of the Indus in Baluchistan and Afghanistan, which may conveniently be designated the Sulaiman system; secondly, the range of the Himalayas rising north of the plains of the Punjab and the Ganges; and, thirdly, the eastern mountains which separate Assam and the Bay of Bengal from Burma, which may be referred to as the Patkoi system.

Before proceeding to the consideration of the larger mountains it will be well to make some passing reference to two minor ranges of hills, which, in spite of a great difference in aspect and composition, present a certain analogy of structure and position, filling in, as they do, the angles between the Himalayan ranges and those of the western and eastern hills. These are the Salt Range of the Punjab, and the range which, known in different portions as the Garo, Khasi and North Cachar hills, may be described as the Assam Range.

Salt-Range and Assam Range.

The Salt Range is composed of fossiliferous marine sediments, ranging in age from the oldest to the newest of the recognized geological periods, and at their base are found the great deposits of rock salt from which the hills derive their name. The composition of the rocks, no less than the arid climate, gives these hills a very different aspect from the Assam Range, in which Cherrapunji is situated—the wettest place in the world. That range, as regards the rocks composing it, is a fragment of the old peninsular land area, and is composed of ancient sediments and gneisses of peninsular type. Differing from each other in all these respects, the two ranges agree in that they are not mountains of compression, but of simple elevation, in both cases along the southern face, which rises in an abrupt scarp, while from the crest a plateau, more or less undulating and cut into by stream valleys, slopes northwards in each case.

Sulaiman system.

The Sulaiman system, rising westward of the alluvial plains of the Indus, forms a complex of hills, consisting of a number of separate minor ranges and ridges, with

a prevailing direction of about north to south, or east to west, which are inextricably interlaced into what must be regarded as a single group or system of hills, though it cannot be regarded as a range in the ordinary acceptation of the word. The climate of this region is dry or arid, and the hill-sides are mostly bare and devoid of soil or vegetation; it is not desert, however, and the rain, when it falls, flows off the bare hill-sides, causing the streams to rise rapidly in volume and come down in great floods of water mixed with mud and boulders. In a climate such as this the effect of rain and rivers in shaping the surface is especially marked, and the valleys are broad and open where they traverse the softer and more easily removed rocks, while between these open valleys the streams traverse ridges of harder rock, in narrow, precipitous-sided, and often impassable gorges. These are appropriately known by the name of *tangi*, a word which may be literally translated as a tight place, and here the traveller, who uses the dry bed of the stream as a pass through the mountains, may be trapped, with no possibility of escape when the river rises, as the result of rain that has fallen farther up the valley; man and beast are caught up in the avalanche of mud and stones, which marks the forefront of the flood, and swept away, probably never to be heard of again.

Gorges of the Sulaiman.

One of the best known of these gorges is the Chappar rift, on the way from Sibi to Quetta, where the drainage of over a thousand square miles of country is carried through a gorge not twenty feet in width, and similar instances are not uncommon. The deepest and narrowest of these gorges are usually found in those streams which can be shown to have recently extended their drainage area, and therefore their size, by the process known as capture; that is to say the head-waters of the river cutting back into the watershed have ultimately reached the bed of the tributary of some other stream, flowing at a higher level, and diverted its waters, thus increasing the size of one stream at the expense of the other. This process has been active throughout the region and has

had an important influence on the course of the caravan routes, which do not traverse the country by the principal valleys, where the river, being an aggressive one and increasing its volume by capture, flows through a gorge that is still a close fit for the stream, but rather choose the valleys of those streams which are being robbed of their drainage; and consequently occupy gorges, now too large for the streams that flow through them, so leaving room for traffic.

Valley plains.

The uplift of these hills has been a very recent episode in geological history, and is in fact still going on, but not uniformly throughout the region; and a very striking feature, resulting from the local changes of relative level, is the frequency of valley plains, often of great extent, occupying rock-bound basins surrounded by hills, and frequently without any outlet for the drainage. These are filled with a fine-grained deposit of dust, wind-blown from the surrounding hills, the surface of which rises gently from the central portion of the plain to its margins and is covered with verdure after heavy rain in the early summer, but normally forms a barren plain of sun-baked yellowish or reddish clay.

Gravel slopes.

Another noticeable feature of this region is the prevalence of great gravel slopes fringing the foot of every range of hills, and frequently extending several miles from them. This fringe of gravel, or rather rock-débris (for much of it is hardly rounded), is formed by the union of fans of material washed down from the hills by the streams, and has a surface slope of 300 to 600 feet in the mile; it is important to the inhabitants as a source of water-supply which, when tapped by a *karez*, is an essential element in the agricultural economy of these valleys, and of all the drier parts of Asia. The *karez* is a tunnel driven into the gravel slopes, at a lesser gradient than that of the surface and, consequently, getting gradually deeper and deeper, till it penetrates below the level of permanent saturation, when, acting like a subsoil drain, it collects water, which flows through the tunnel to the surface, to be used there for irrigation. The

amount of labour spent on some of the karezes and the depth of the numerous shafts through which the material removed has been raised to the surface, are astounding; they are frequently miles in length and the shafts near their heads are said to reach as much as 150 feet in depth.

Ranges of Sulaiman region.

The hill ranges of this area present too great complexity to be described in detail. The best known and best marked are the Khirtar range, which rises west of Sind, and the Sulaiman, which rises to the west of the Punjab, to the north of the embayment of the plains from Shikarpur to Sibi; these ranges have a south-to-north course. Farther north comes the nearly east-and-westerly range of the Safed Koh, and north of this, where the western hills merge into the Himalayas, comes a little known and, in parts, unexplored country, dominated on the north by the range of the Hindu Kush, whose easterly extremity is continuous with the Himalayas.

The Himalayas.

The Himalayas, rising as a mighty mountain barrier along the northern edge of the alluvial plains, form by far the most striking geographical feature of India. For a length of over 1,250 miles the snow-capped rampart is continuous and, culminating in Mount Everest at 29,002 feet above the sea, contains the loftiest mountains of the world. The unity of this range is unmistakable, both geographically and geologically, but as regards the proper classification of the minor ranges of which it is composed, very various opinions have been expressed at different times and by different observers, a divergence of opinion which is probably due to the fact that the detailed geography is unknown for at least two-thirds of the length of the range. At the north-western end, the British districts of Kumaon and Garhwal, the territory of the state of Kashmir, together with the minor native states and British districts lying between them, have been mapped in detail, and farther east a narrow strip comprising the British district and native state of Sikkim; but elsewhere the topography of the mountains is unknown, except as regards the general course of some of the larger rivers and the position of the snowy peaks.

In spite of this ignorance attempts have been made to extend a classification, which is more or less applicable to the part of which the topography is known, to the larger area where it is almost completely unknown, and the general tendency has been to divide the range as a whole into a series of ranges, running more or less parallel to each other and to their general course. Even in the north-western area this interpretation seems doubtful, and one of the few facts that are certain about the less-known part of the range is that the group of highest peaks, of which Mount Everest is one, lies along a line somewhat oblique to the general course of the range, and it is probable that instead of a threefold or fivefold series of parallel ranges we have a number of shorter ones running obliquely to the general course of the zone of maximum elevation.

Parallel zones: the foot-hills.

We shall return later on to this question of the ranges of the Himalayas, which can best be treated after the general character of the range as a whole, and of its valleys, has been dealt with. For the present it will be enough to note that, if the Himalayas are not formed by a series of parallel ranges, there is certainly a division into parallel zones of differing type. Along the southern edge come the foot-hills, composed of uptilted gravels, sands, and clays of late Tertiary age. The rocks of which they are composed differ in no way from the deposits which are now being formed along the northern edge of the plains, and have yielded a remarkable series of remains of extinct species of elephants, and other large mammals, composing the well-known Siwalik fauna.

The Dun.

In places these outer hills are continuous with the higher hills behind them, but frequently they form a minor range of low elevation behind which, and separating it from the main range, is an expanse of open country known locally by the name of *dun* (Dhoon), of which a series is found along the outer edge of the hills. Standing at a somewhat higher level than the plains beyond the outer hills, and formed of gravels brought down from the mountains behind, these *duns* are mostly covered

with extensive forests, through which roam the large game which is sought after by the sportsman, and is doubtless descended from the animals which lived in the similar regions of the Siwalik period.

Lower Himalayas.

Behind these foot-hills and valley plains there is a zone of hill country, more elevated than the outer hills, but distinctly lower than the main snowy range. It may conveniently be distinguished as the lower Himalayas. It can generally be recognized as a fairly well-marked belt of hills, some 50 to 60 miles broad, in which the summits range from about 6,000 to 12,000 feet above sea-level, lying between the high mountains of the central range and the low hills of the sub-Himalayas. As a rule the distinction between this and the regions on either side is tolerably well defined, but in places they pass gradually into each other.

Main range.

Farther in rises the main range of the Himalayas, with its peaks towering to 20,000 feet and upwards, snow-clad throughout the year, but traversed by narrow deep-cut gorges through which the rivers flow. This rampart intercepts nearly all the moisture carried by the winds from the Indian Ocean, and behind it comes a barren region, where vegetation is absent away from the streams or artificially irrigated oases, and where the valleys are mostly filled with débris, washed or fallen from the hills around.

Lakes.

Lakes of any size are remarkable for their absence from the Himalayas, a feature which may be explained by the heavy rainfall and the steepness of the general slope of the surface. These have combined to give the streams a great power of erosion, and caused them to drain those depressions which either have been formed, or might have been formed and, in other circumstances, given rise to lakes. Small lakes and tarns are found in some parts of the higher Himalayas, and there is a remarkable group of lakes near the outer edge of the hills round about Naini Tal in Kumaon, but the larger lakes are confined with one exception to the inner Himalayas of the Tibetan region, where their existence appears, paradoxically

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PLATE III. THE HIMALAYAS, FROM DARJILING

(Visual Instruction Committee)

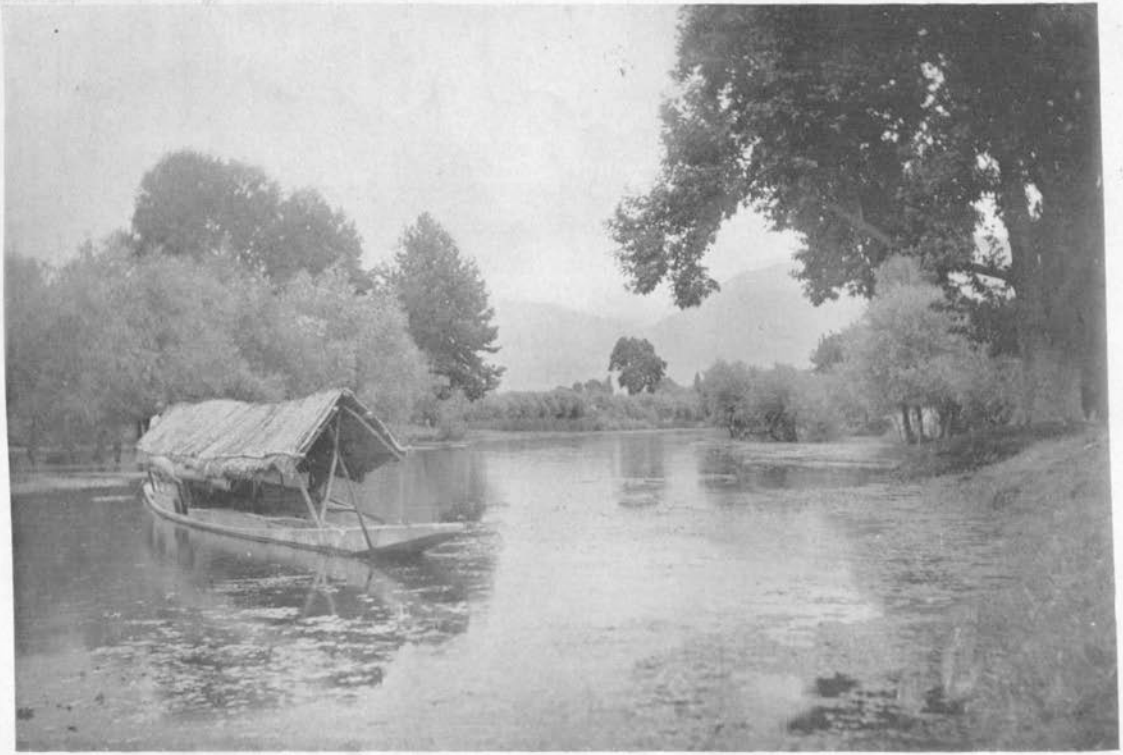

PLATE IV. DALL LAKE, KASHMIR

(Sir S. Eardley-Wilmot)

enough, to be due to the dryness of the climate. In some cases they appear to be due to blocking up of the river valleys by débris washed down from the mountains on either side, in others to irregularities of upheaval, similar to that which has been described in the Sind valley, and in either case the formation of the lake is due to the stream being unable to maintain its channel. In nearly every case, indeed, there is no outlet from the lake, and the water which flows in is dissipated by evaporation, with the result that the lake water is more or less impregnated with salts that frequently crystallize out along its shores.

Kashmir valley.

The one exception noticed above is the lake of Kashmir, which deserves special mention. The actual lake, or lakes, of the Kashmir valley are mere lagoons precisely analogous to those of the Gangetic and other deltas, depressions in the surface of an alluvial plain, caused by the uneven accumulation of silt; but the wide and fertile plain in which they are situated is doubtless a product of the unequal uplifts which have marked the rise of the Himalayas. Many such are known, but none of anything like the extent of this one, situated near the termination of the Himalayas proper, where they bend round into the mountain systems of the Hindu Kush and eastern Afghanistan. The vale of Kashmir is commonly regarded as having once been a vast lake, now filled up by the alluvium of the Jhelum and its tributaries, but detailed geological examination gives no support to this view. The great depression was probably gradually formed and as gradually filled up; the surface of the plain has doubtless usually carried sheets of water, as it now does, which have varied in extent at different times, but whether these were formerly more extensive than at present is unknown.

Drainage: upper Indus and Sanpo.

It is a common feature in mountain ranges that the line of highest peaks does not mark the line of the watershed, but that the rivers after rising on one side of the main range, and draining a portion of its slopes, break through and make their escape on the opposite side of

the range. The Himalayas form no exception to this rule, but provide, indeed, an extreme case of it, for the whole of the drainage of the northern slopes of the range, till we come to the extreme north-western end, finds its way to the south. Along the whole length of the range, separating it from the plateaux and mountains of Central Asia, two valleys flow in opposite directions, from points not 50 miles apart, one being the upper course of the Indus, while the other, the Sanpo, is now accepted as the upper course of the Brahmaputra River. The relation of the Himalayas to the great Central Asian mountain mass resembles, indeed, though on a vastly larger scale, that of the Bernese Oberland to the Alps, and, like the valleys of the Rhone and the Rhine, the Indus and Brahmaputra Rivers flow away from each other along the same general line, and each of them ultimately breaks through the range in mighty gorges. That of the Indus is known, and is probably the most stupendous gorge in the world, the river flowing at a level of about 3,000 feet above the sea between precipices which rise to over 20,000 feet. The gorge connecting the Sanpo of Tibet with the Brahmaputra of Assam has never been traversed, but has been penetrated from below upwards and from above downwards till there can no longer be any doubt that it is really continuous, nor that the river flowing along the northern face of the eastern Himalayas, which was at one time supposed to form the head-waters of the Irawadi, is really the upper portion of the Brahmaputra River.

Origin of drainage system.

Not only do these two valleys cut off the drainage of the Himalayas proper from that of the Central Asian basin, and push the main watershed far northwards of the main range, but there is a similar divergence between the latter and the parting, between the north-flowing tributaries of the upper Indus and Sanpo, and the rivers which flow more directly southwards, all of which traverse the main range in deep-cut gorges from sources that lie to the north of the line of the highest peaks. Various explanations have been offered to account for this peculiarity of the drainage system. The earliest supposed

that the rivers had found their way through great fissures, opened during the upheaval of the mountains; closer examination has found no support for this. Another explanation is that the rivers are older than the mountains, and have maintained their course by wearing down their channels as the mountains were gradually elevated. A third explanation supposes that the first effect of the upheaval of the Himalayas was the formation of huge lakes behind them, and that these lakes, overflowing at the lowest gaps in the range, scoured out the valleys through it. A fourth is that the rivers on the south have gradually cut back through the hills and drained the northern slopes, this cutting back being determined by the fact that nearly the whole of the rainfall is intercepted by the range and falls on its southern slopes; here too the course to the plains at the foot of the hills is shorter, so that the southern streams are not only larger in volume, but flow down a steeper slope, and therefore have been able to cut back into the watershed and invade what was originally the drainage area of the streams to the north of the range.

Gradients of main valleys.

There is no space, nor is this the place, for a discussion of these rival hypotheses; all that can be done is to say that the most probable explanation is a combination of the second and fourth and to give a short description of the leading features of the valleys. Speaking generally, the valleys of the chief rivers of the Himalayas penetrate the mountains to within ten miles of the line of highest peaks without rising more than 4,000 or 5,000 feet above sea-level; then, as they cross this line, they rise to some 9,000 or 10,000 feet within a few miles, and above this the gradient again lessens till near the head of the valley, where there is a rapid rise to the crest of the watershed, while on the opposite side the drop is much less, and at times almost imperceptible. There is also a great contrast between the valleys on either side of the watershed; the southern approach of the passes being through deep-cut, often precipitous-sided valleys, at the head of which there is a long and steep ascent, while on the other side

there is generally a comparatively short and gentle descent, or even none at all appreciable, into an open, gently sloping valley, whose form suggests that it once carried, and was formed by, a much larger stream than that which now flows through it. These features suggest that the southern streams are cutting back into the watershed and gradually extending their drainage area at the expense of the northern ones, and in some cases this has actually been proved. The crests of the Chitichun group of passes in Kumaon, for instance, have been shown to lie some three to five miles farther north than the position which they occupied during the Glacial Period; but the most striking instance is that of the Sind valley, in Kashmir, which has been proved to have lengthened its course and cut back at least twenty miles into the hills since the close of the last great extension of the glaciers.

Recent uplift of Himalayan system.

At the same time the rapid rise of the level of the river beds, as they cross the line of the highest peaks, suggests that there has been a greater uplift along this line than elsewhere, though not rapid enough to stop the flow of the river, which has cut down its bed as this was upheaved; the erosion of the river-bed, in fact, has not been able to keep pace with the uplift, but has been rapid enough to keep the channel open. The mere fact that the Himalayas are the loftiest mountains in the world would suggest that they are also the newest, for all mountains are constantly being attacked and lowered by frost and rain, and the action of streams and glaciers. Apart from this there are indications that the uplift of the Himalayas is, geologically speaking, extremely recent and is still in progress, though probably at a lesser rate than in the past. The most striking instance of this, which is at present known, must again be taken from the Sind valley, where the crest of the Zoji La, the pass over which runs the main road from Kashmir to the inner Himalayas and Central Asia, is now about 2,500 feet higher than the plain of Sonamarg, some eight miles to the southward; towards the close of the Glacial Period this relation was reversed, and the latter then stood at

the higher level, for the drainage from it flowed down to and over what is now the pass. Here we have an uplift of over 2,500 feet which has taken place in geologically recent, that is post-glacial, time.

These facts suggest that at any rate the greater part of the peculiarities of the Himalayan drainage must be attributed to the effects of surface sculpture. The upper part of the drainage area of the Sutlej River, for instance, appears to have formed, at one time, part of the drainage area of what is now the upper Indus valley; and the course of the northern tributaries of the Sanpo, being directed south-westwards and entering the main valley at an acute angle pointing up stream, suggests that they formerly formed part of a wholly different drainage system, which has been invaded and diverted to the eastward.

Classification of ranges independent of drainage system.

The rivers and their valleys, therefore, form no key to the classification of the ranges; nor do the watersheds, for the rivers frequently cut across what is obviously a continuous range, and the watershed frequently passes transversely from one range to another, across what is equally obviously a continuous valley, though it may be formed by parts of two distinct drainage areas. Peaks, also, give no certain clue, for they are the relics of a more extensive area of upheaval, left by the removal of the surrounding rock, and the classification of the ranges becomes a matter of great difficulty. Frequently an indubitable continuity and individuality may be recognized, as in the Pir Panjal range, to the south of Kashmir, or the Ladak range, which forms one of the best-defined components of the north-west Himalayas, in spite of its being cut across and through by the valley of the Indus. But the limits of these ranges are indefinite, and their individuality may be likened to that of the fishes in a shoal, or the regiments of an army. The minor ranges, in fact, are local features due to local differences in the texture of the rock, or of the amount of uplift, or of both combined, and no useful purpose will be served by attempting to trace a continuity or connexion between them.

Boundaries.

The unity of the great mountain system, of which these minor ranges are the individual components, is equally obvious and its limits equally ill-defined. On the north it is separated from the uplands of Tibet by the valleys of the Indus and Sanpo, but the separation is merely superficial and the two form part of, and were formed by, the same great series of earth movements. At its north-west, in the region of the Pamirs, the Himalayas merge into a maze of mountains, from which the ranges of the Kuen Lun, Tian Shan and Hindu Kush branch off, and which merges southwards into the Sulaiman system of hills, to the west of the Indus plain. Eastwards the Himalayas equally become merged in a great maze of mountains in Western China, from which are separated the ranges running southwards through the Shan Hills and those which run south-westwards and then southwards to the west of the drainage area of the Irawadi.

Patkoi-Manipur system.

The Patkoi range proper lies south of the upper Assam valley, but the system of mountains to which it belongs continues through Manipur territory till it becomes continuous with the Arakan Yoma and, sinking beneath the waters of the sea at Cape Negrais, reappears to form the Andaman and Nicobar Islands. These mountains are for the most part clothed with a dense impassable forest, and large tracts are almost uninhabited. They present a maze of hills, deeply cut by a peculiar system of drainage, the rivers flowing for long distances between two parallel ridges, till they meet another stream, flowing along the same general course but in the opposite direction, and the combined waters break through one of the ridges bounding the valley, only to turn once more and flow parallel to their former course. So by a tortuous course they reach the outer limits of the hills.

Among these mountains small valley plains of alluvium are met with, and one of considerable size and importance. The valley of Manipur resembles in many respects that of Kashmir in the Himalayas; it is, similarly, a product of the unequal elevation of the mountains, which has left

a depression to be filled up by the alluvium of the rivers draining into and through it; and along the eastern flank of the hills, towards Burma, are some open valleys bounded by detached foot-hills, resembling in many ways the *duns* of the southern foot of the Himalayas.

Burma. Burma, if we except the Shan States and the Tenasserim Province, is practically identical with the drainage area of the Irawadi and Sittaung Rivers. As already mentioned, it forms a well-defined geographical region which, whether regard be paid to geological structure or physical aspect, may be regarded as formed by two parallel valleys; one carrying the Chindwin and lower Irawadi Rivers, the other the upper Irawadi and Sittaung, for not only does the Sittaung valley continue the line of the upper Irawadi but, like it, is bounded on the east by the edge of the Shan Hills and separated, at its head, from the Irawadi valley by a low gap. Similarly, on the west, the Chindwin and lower Irawadi valleys lie along the foot of the hills of the Patkoi-Arakan Yoma systems of ranges.

The area comprised by these valleys is also a well-defined geological province, bounded on the one hand by the highly folded ranges of the Patkoi and Arakan Yoma, and on the other by the elevated plateau of the Shan Hills. Where not covered by alluvial deposits of the Irawadi River, the rocks are of late Tertiary age, and in the dry zone, which lies between the rainy areas of the head-waters on the one hand and the delta on the other, these Tertiary sandstones give a peculiar aspect to the country. Among them many fossilized tree-trunks are found in places, often whole trees of forty feet and more in length, of flinty material, still showing all the structure of the original wood. These silicified logs, which are collected by the Burmans and set up in their villages, and more especially round the borders of the land attached to their pagodas and monasteries, have given rise to the old-time legend that the waters of the Irawadi River had the property of converting wood into flint, a notion which is devoid of any foundation in fact.

Irawadi and Salwin Rivers.

Eastward of the Irawadi lies the other great river of Burma, the Salwin, whose sources are believed to lie in Tibet. At one time the Irawadi River was supposed also to have its sources in this region, but the advance of exploration appears to have shut out all possibility of this, and the whole of the drainage, which might have found its way into the Irawadi, is now known, or believed on good grounds, to belong to the Brahmaputra or Salwin Rivers, and the sources of the Irawadi are accepted as lying in the hills to the south and east of Assam.

This limitation of the Irawadi drainage area leaves the Salwin valley as one of the most remarkable in the world. Draining a large area in eastern Tibet, it then flows for over six degrees of latitude through a long, straight valley, deep-cut between two mountain ranges not more than thirty miles apart from crest to crest. Hemmed in on one side by the drainage of the Irawadi tributaries, on the other by the parallel valley of the Mekong, it receives no tributary on either side, and only south of 23° does the watershed recede on either side, but mainly on the west, to give room for some unimportant tributary streams.

Shan Hills.

On either side of the lower course of the Salwin rises the plateau of the Shan Hills, a wide expanse of undulating country presenting the characters of an old land surface, long exposed to the levelling and smoothing effect of weathering. In two ways only is this surface broken by steep slopes; they are found on the sides of the deep gorges which have been cut into the general level of the country, or where there rise what, seen from one side, appear to be high ranges, though they are in reality only the scarped edges of an uplifted portion of the plateau, which slopes away from the crest, in the same type of country as extends to the foot of the steep slopes.

In parts of this area are found considerable spreads of limestone, which give rise to a peculiar system of underground drainage, the rivers disappearing underground and, after passing under the hills through tunnels, usually impassable, reappearing in what would be a different

drainage area but for the underground connexion between the two.

Volcanoes.

It is in the region between the Shan Hills and the ranges of the Patkoi system, and in its continuation under the Gulf of Martaban, that the only volcanoes of the Indian Empire are found. They provide a remarkable series of extinct volcanoes and evidences of volcanic action, which commenced in the Miocene period and only ceased in, geologically speaking, very recent, though prehistoric times. Some, which have not yet been studied in detail, are known in the Shwebo district. On the Chindwin River, above Monywa, there is a group of eleven crater pits, several with sheets of water at their bottom, ranging in size up to about a mile in diameter with a depth of 150 or 200 feet below the surrounding country. Farther south in the Pakokku district is a group of extinct volcanoes, some of which still show the volcanic cone perfectly preserved in form, and still farther south in the angle where the Irawadi River, after a westerly course, bends southwards again, the isolated volcanic cone of Popa rises to a height of nearly 5,000 feet above the sea, forming a landmark visible from all the surrounding country, and conspicuously seen from the river. This volcano has long been extinct, and the old crater, breached by the action of rain and streams, no longer preserves its original form, but the general aspect of the hill, as seen from afar, still shows all the typical characteristics of a volcanic cone. South of Popa no volcano is known in Burma, but the line is continued by two volcanic islands rising from the Bay of Bengal. The northern of these, Narkondam, has long been extinct and the original form profoundly modified by stream valleys which have been carved out of its sides, but the other, Barren Island, was in eruption at the beginning of the nineteenth century, and steam and hot sulphurous vapours still issue from its summit and slopes. Continued southwards, this line of volcanoes would pass into the great chain which traverses Java and Sumatra, known geographically as the Sunda volcanic belt; and it is not

unreasonable to regard the volcanoes of the Bay of Bengal and of Upper Burma as forming the continuation, and termination, of the great band which traverses the Malay Archipelago.

Geology. Though only a very brief account of the geology of India can be given, some further reference seems desirable, to complement those already made to such of the geological formations as have any marked effect on the geographical aspect of the country. As the exigencies of the space which can be devoted to this subject do not permit of the details of stratigraphy being dealt with, and as no useful purpose would be served by giving a mere list of names, only the main outlines will be dealt with, and of these the first to be noticed is that in India the main divisions of the sequence differ from those usually adopted in Europe. The rocks may be divided into four great groups, each forming a continuous system, or only divided by breaks of lesser importance and limited extent, and each separated by great breaks and intervals of time, represented poorly or not at all by sedimentary deposits.

Archæan. The oldest of these groups is that known as Archæan. Next after it comes the group of rocks which, in the peninsular area, are of unknown age owing to the complete absence of fossils, and were formerly called Transition and older Palæozoic, but of late years have been grouped, in the publications of the Geological Survey of India, as Purana; their equivalents in the extra-peninsular area cannot be known, but must be looked for among the older Palæozoic and Pre-cambrian rocks.

Following on the great break in the succession comes the next group of rocks, which, starting with Permo-carboniferous deposits, continues as a conformable series, though varying in type, through the Trias and the Jura. After this there comes, nearly everywhere, a gap, and the next group of deposits, commencing in the Cretaceous period, ranges continuously into the Recent age. From this it will be seen that the usual division of Palæozoic, Mesozoic, and Tertiary does not apply in India, and that

the principal divisions lie within the limits of the Palæozoic and Mesozoic eras.

The Archæan rocks in India, as elsewhere, consist of crystalline schists, gneisses, granites, and kindred rocks, together with highly metamorphosed sediments, comprehensively grouped under the general term of Archæan. In the gneisses of the Peninsula two main types have been recognized, designated respectively as the Bengal and the Bundelkhand gneisses, the former being more foliated and flaggy in character and the latter more massive. The Bhundelkand gneiss was formerly regarded as the oldest rock in India, but, since the intrusive character of many of the gneissose rocks has been recognized, this determination has become questionable; it is certain that intrusive crystalline rocks of gneissose or granitic character are largely exposed in the peninsular area, and it is probable that much of the rock which was supposed to be older than the oldest distinctly sedimentary formation is in reality of younger age.

Among the metamorphosed sediments of Archæan age the only series which can receive special mention is the Dharwar, noteworthy as being the home of the rich deposits of gold-ore that are found in the Mysore gold-field. Mention must also be made of the Bijawar system, met with in Bundelkhand and again in the Son valley, composed of schistose slates and quartzites, with beds of red jasper, which were formerly classed as transition but may very likely be the equivalents of the lower part of the Cuddapah series, mentioned below.

Cuddapah and Vindhyan.

Following on the great break, which succeeded the Archæan era, comes a series of distinctly sedimentary rocks, the lowest of which contain fragments of older rocks belonging to the Archæan systems. In the peninsular area the most important of these Purana rocks are the Cuddapah and the Vindhyan systems, the former being the older and only known, with certainty, in the Madras Presidency. It is of great thickness, composed of four distinct series of rocks, each composed of conglomerates and quartzites in the lower portion, passing

upwards into slates and limestones, and aggregating a thickness of 20,000 feet.

The Vindhyan system is of much less thickness, and in its typical area consists of two bands of massive sandstones, and two of shales and limestones, the former having a thickness of about 500 feet each and the latter two of about 1,500 feet each. The lowermost is known as the lower Vindhyan series and appears to be represented by a great spread of limestones and shales in Chhattisgarh, and by the Karnul series, which overlies the Cuddapah series with a great unconformity, in Madras.

The close of the Cuddapah period was marked by a great development of mountain-building. At this time the folding and elevation of the Nallamalai Hills, near the east coast, and of the Aravali Mountains took place, and at the same period a range, traversing India from west to east, seems to have run much along the present course of the Satpura Hills. The relations of the Vindhyan rocks to these old mountains, along the western and southern boundaries of the main exposure, seem to be very similar to that of the upper Tertiary deposits, along the foot of the Himalayas, to the older rocks of the range, and it is probable that the Vindhyans were formed during the elevation of the mountains, and out of their débris, in the same way as the Gangetic alluvium during the uplift of the Himalayas.

Extra-peninsular area.

Nothing is known of the age of these rocks except that at latest they must be of Palæozoic age, and little can be said of their equivalents in the extra-peninsular area. Old crystalline rocks are largely developed in the Himalayas, where they are intermingled with intrusive gneissose granites of much later age, and the whole of the southern slopes of the range, from Garhwal eastward, appears to be composed in the main of rocks of the peninsular type. There is also a large expanse of old crystalline rocks eastward of Burma proper and in Tenasserim. Cambrian and Silurian slates and limestones have been found in the Salt Range and in the north-west Himalayas, and again in Eastern Tibet and

Indo-China. The Devonian period is very poorly represented in India, and only with the close of the Palæozoic era does the sequence again become tolerably complete, though still preserving a very different character in the peninsular and extra-peninsular areas.

Gondwana system.

In the Peninsula the Gondwana system consists of a long sequence of rocks, whose character and fossil contents show that they were deposited by rivers on a land surface. They lie with a great discordance on all the older formations, and commence with a series of rocks containing boulder-clays, and in places resting on a surface scored and smoothed in the manner characteristic of ice-action. The beds lying on this surface comprise some typical boulder-clays, and this evidence that a great ice-sheet once extended over land which now lies within the tropics, is not only interesting in itself, but furnished the first clue to the age of the rocks, at one time a vexed question, though now generally accepted as Permo-carboniferous. This Talchir, and the overlying Damuda, stages are characterized by a peculiar flora, composed of cycads and ferns, the commonest and most characteristic forms of the latter being *Glossopteris* and *Vertebraria*, the latter representing the rhizome of the former; they form the Indian coal-measures, the whole of the coal production of India, with the exception of some extra-peninsular coal-fields of Tertiary age, being obtained from these rocks.

The lower Gondwanas are succeeded by a great thickness of beds, still land deposits of fresh-water origin, which pass into marine deposits of Jurassic age on the west, in Cutch and western Rajputana, and into marine Cretaceous beds on the coast of Madras.

Marine deposits of extra-peninsular area.

In the extra-peninsular area of the Salt Range and north-west Himalayas this same period is again represented by a continuous series of deposits, but here of marine origin. As in the Peninsula, they commence with a boulder bed, showing evidence of the presence of floating ice, which is very conspicuously developed in the Salt Range and appears to be represented, though the evidences of ice are less certain, in the Himalayas. In

the Salt Range these beds are succeeded by a series of highly fossiliferous limestones, known as the Productus limestone series, and in the Himalayas by a great series of marine sandstones, shales, and limestones ranging through the Permian, Trias, and Jura. In Kashmir some beds have been found containing fragments of *Gangamopteris*, the characteristic plant of the lowest stage of the Gondwana system, associated with marine fossils of Permo-carboniferous age, thus affording a link between the formations of the peninsular and extra-peninsular type, and finally dissipating any lingering doubt as to the age of the lowest beds of the Gondwana system.

The fragmentary information which we have of the geology of the regions lying north of the Himalayas shows that marine deposits are to be found along the length of them, though absent, so far as is known, from the southern slopes; they are again met with, of various ages, in the country east of Burma proper, and it is probable that Triassic and younger rocks of Mesozoic age are represented in the Arakan Yoma.

Beginning of Tertiary era.

The close of the Mesozoic era appears to have been marked by a comparative cessation of deposition, the lower Cretaceous period being poorly represented in comparison with the earlier periods, but after this break there was ushered in a great period of deposition, and changes in the aspect of land and sea, which has continued till recent times. Before proceeding to the consideration of these deposits and changes it will be well to review briefly the conditions of what is now the country comprised in the Indian Empire. The whole of the present peninsular area was dry land, which extended over the Gangetic plain to the Assam hills and the southern slopes of the eastern Himalayas. The eastern sea coast of this land area coincided fairly closely with the present east coast of India and the southern edge of the Assam hills. On the west dry land extended, over what is now the Arabian Sea, to an unknown distance, but farther north the edge of the land is marked as running to the west of the Aravali range, through western Rajputana,

then, after a gap where the exact limits cannot be traced, it is found again to the north of the main range of the Himalayas in the British districts of Kumaon and Garhwal, maintaining, so far as is known, much the same position along the length of the range, till it curved round to meet the sea margin along the southern limit of the Assam range. Such was the distribution of land and sea at the commencement, and till about the middle, of the Cretaceous period, and much the same distribution, with temporary variations, appears to have continued back to about the Cambrian period of European geology.

Deccan traps.

In the Peninsula, the close of the Cretaceous period marked the beginning of the great outburst of volcanic energy which gave rise to the formation of the Deccan traps. This closed in the Eocene period, and since then the peninsular area has seen no formations but superficial ones, of alluvium and laterite. In the extra-peninsular area, on the contrary, we have great deposits of upper Cretaceous and Tertiary rocks in the country west of the Indus, in the western Himalayas, and again in Burma. At the outset they were all of marine origin, but as time went on, and as the extra-peninsular mountain ranges were formed, this sea gradually gave place to dry land, and marine to terrestrial formations.

In the western hills the Eocene period was marked by a great formation of nummulitic limestones and shales, which was succeeded by marine Miocene deposits, and only with the Pliocene did these give place to river sands and gravels. In the Himalayas, where the change took place earlier, the Eocene rocks are of marine origin, but all later ones are dry land deposits formed by streams and rivers, classed together under the general name of Siwalik, a name which was originally applied only to the uppermost division of the series. In Burma, too, the Eocene deposits are all of marine origin, but with the Miocene period the transition to dry land conditions commenced in Upper Burma and gradually extended southwards, the change occurring later till, in Lower Burma, even Pliocene beds are found of marine age.

Upper Tertiaries and alluvial deposits.

The upper Tertiary deposits of India present a remarkable uniformity in character. In the west, as in the east and in the central expanses along the Himalayas, they consist of a great series, counting several thousands of feet in thickness, of massive sandstones, clays and conglomerates. Though a certain subdivision of the series is possible in each area, into stages characterized by a prevailingly clayey, sandy, or pebbly character, the individual beds present a great inconstancy, each separate bed being of limited extent and giving place, laterally, to deposits of a different character. The gravel beds are composed of well-rounded fragments of hard crystalline rocks, ranging in size from the smallest pebble to boulders of over a foot in diameter, which have evidently travelled considerable distances in large rivers; and along the foot of the Himalayas it is evident that these must have followed much the same course as the great rivers of the present day, and must have been their predecessors, draining from a younger and less developed range than the existing Himalayas. On the west the gravels had possibly a similar origin from the hills beyond the Indus, but in Burma the derivation of the pebbles, and the means by which they reached their present position, is less evident. The final stage in Indian geology is represented by the alluvial deposits of the Indus, Ganges, and Irawadi, and of the peninsular rivers.

Literature and Maps.

[The *Memoirs* and *Reports* of the Geological Survey of India are the chief sources of information on this subject. The *Manual of the Geology of India* (official, 2nd ed., Calcutta, 1893) contains results of the Survey work and a full bibliography down to that date. See also Oldham, 'The Evolution of Indian Geography', in *Geographical Journal*, March 1894; and on special areas such works as F. D. Ascoli, *The Rivers of the Delta* (Calcutta, 1912); Sir W. R. Lawrence, *The Valley of Kashmir* (London, 1895); Filippi, *Karakoram and Western Himalaya* (London, 1912), and numerous other accounts by explorers in the Himalayas. Among general works (appropriate not only to this but to following chapters) see *Imperial Gazetteer of India* (26 vols., 2nd ed., Oxford, 1906–9); Sir J. B. Fuller, *The Empire of India* (London, 1913); and works of Sir T. H. Holdich, e.g. *The Indian Borderland* (London, 1901); *The Gates of India* (London, 1910); *India* (in 'Regions of the World' series, London, 1904).

The Survey of India is one of the most celebrated organizations of its kind in the world; a discussion of its origin, work, and maps is given in the General Volume in this series.]

INDIAN EMPIRE — BATHY-OROGRAPHICAL.

64 68 72 76 80 84 88 92 96 100

32 28 24 20 16 12 8

HIMALAYA MOUNTAINS
KWEN-LUN MOUNTAINS
TIBET
Hindu Kush Mountains
Mustagh (Karakoram) Ra.
Paropamisus
Koh-i-Baba
Hazara Highlands
Safed Koh
Sulaiman Range
Kirthar Range
Salt Ra.
Takht-i-Sulaiman 11300 ft.
Helmand Desert
PLAIN OF THE INDUS
THAR OR INDIAN DESERT
Siwalik Hills
Terai Swamp
Gangri Range
Dungbura Ra.
Dangla Ra.
Baien-kara Mts.
Tangla Range
Nanda Devi 25600 ft.
Kailas 21900 ft.
Dhaulagiri 26826 ft.
Mt. Everest 29002 ft.
Kanchanjanga 28150 ft.
Mt. Godwin Austen (K2) 28274 ft.
Nanga Parbat 26629 ft.
Namkiu Mts.
Patkoi Range
Garo Hills
Khasi Hills
Barail Ra.
Mt. Japvo 9890 ft.
PLAIN OF THE GANGES
Aravalli Range
Vindhya Range
Satpura Range
Kaimur Range
Malwa Plateau
Bhanrer Ra.
Maikal Ra.
Mahadeo Hills
Chandor Hills
Ajanta (Indhyadri) Rs.
Western Ghats
Malabar Coast
Eastern Ghats
Coromandel Coast
KARNATIK
Nilgiri Hills
Shevaroy Hills
Jawadi Hills
Palni Hs.
Cardamon Hs.
Arakan Yoma
Pegu Yoma
Mt. Victoria 10,400 ft.
Mt. Mukai 6300 ft.
Koi Chem-chang 7576 ft.
Koi Pang Ngoum 8100 ft.
Andaman Islands
North Andaman
Middle Andaman
South Andaman
Little Andaman
Ten Degree Channel
Car Nicobar
Nicobar Islands
Camorta
Great Nicobar
Mergui Archipelago
Isthmus of Kra
CEYLON
Pedrotalagala 8326 ft.
Adam's Peak
Kandy
Colombo
Point de Galle
Dondra Head
Cape Comorin
Minikoi
Laccadive Is.
ARABIAN SEA
BAY OF BENGAL
Gulf of Cutch
Gulf of Cambay
Gulf of Manar
Gulf of Martaban
Sundarbans
Mouths of the Indus
Mouths of the Ganges
Mouths of the Mahanadi
Mouths of the Godavari
Mouths of the Kistna
Mouths of the Irrawaddy
Pt. Palmyras
Pt. Calimere
C. Negrais
Karachi
Hyderabad
Bombay
Delhi
Lahore
Amritsar
Jaipur
Agra
Lucknow
Allahabad
Benares
Calcutta
Dacca
Rangoon
Mandalay
Moulmein
Akyab
Chittagong
Madras
Pondicherry
Bangalore
Mysore
Trichinopoly
Madura
Trivandrum
Ahmadabad
Baroda
Surat
Indore
Bhopal
Nagpur
Amraoti
Quetta
Kandahar
Herat
Jalalabad
Kabul
Srinagar
Jammu
Multan
Bahawalpur
Bikaner
Jodhpur
Ajmer
Bharatpur
Meerut
Delhi
Lucknow
Patna
Gaya
Benares
Allahabad
Cawnpore
Gwalior
Udaipur
Rewa
Sambhar L.
Kolar L.
Chilka L.
Tsangpo R.
Brahmaputra R.
Irrawaddy R.
Salween R.
Menam R.
Mekong R.
Red R.
Indus R.
Ganges R.
Godavari R.
Kistna R.
Narbada R.
Tapti R.
Mahanadi R.
Cauvery R.
Jumna R.
Chambal R.
Sutlej R.
Beas R.
Ravi R.
Chenab R.
Jhelum R.
Helmand R.
Arghandab R.
Zhob R.
Dasht R.
Mashkel R.
Hamun-i-Mashkel
Lora Gaman
Kilat
Quetta
Bolan Pass
Khyber Pass
Zhob R.
Tigris R.
Euphrates R.
Tarim R.
Yarkand R.
Kashgar R.
Hotan R.
Aksu R.
Lop Nor
Lake Victoria
Kilimanjaro
Mt. Kenia
Mt. Elgon
Mt. Ruwenzori
Mt. Kilimanjaro
Mt. Kenia
Mt. Elgon
Mt. Ruwenzori
Lake Victoria
Lake Tanganyika
Lake Nyasa
Lake Rudolf
Lake Albert
Lake Albert Nyanza
Lake Victoria Nyanza

INDIAN EMPIRE — GEOLOGICAL.

The Edinburgh Geographical Institute

John Bartholomew & Co.

CHAPTER II

CLIMATE AND WEATHER

1. General Conditions

By Rai Bahadur Hem Raj [1]

From the climatic standpoint the year in India may conveniently be divided into two broad divisions; the dry season and the rainy or wet season. The dry season lasts from about the middle of December to May, and is characterized by the prevalence of land winds, great dryness of the air, large diurnal range of temperature, and little or no rain. The rainy or wet season extends roughly from June to the middle of December, and is distinguished by winds of oceanic origin, high humidity, much cloud, frequent rain, and small diurnal range of temperature. This alternation of seasons is due to the reversal of the temperature difference between land and water in summer and winter, and the consequent change in the wind system. Dry and wet seasons.

The dry season may be subdivided into two periods, the cold weather and the hot weather. The former, as a rule, lasts from the middle of December to the end of February, and is on the whole the most pleasant part of the year in the plains. During this period the air movement is very feeble and is from the north-west in northern India and from the east in the Peninsula, with an intermediate belt of light irregular winds. Subdivision of dry period.

Weather is dry with little or no cloud in the region of the east winds, but is occasionally, and in some years frequently, disturbed in northern India owing to the passage of feeble storms. Most of these either originate in the highlands to the west of the Indus or advance from the Mediterranean region. The majority of these disturbances produce light to moderate rain in the plains Storms of the cold weather.

[1] Under the supervision of G. T. Walker, C.S.I., Director-General of Observatories, India.

of northern India, chiefly in the submontane districts, and more or less snow in the mountain zone to the north and west. Occasionally the associated snowfall is very heavy and widespread, and in the Punjab descends to a height of less than 2,000 feet above sea-level.

The combined rainfall of January and February is below half an inch in quantity over the greater part of

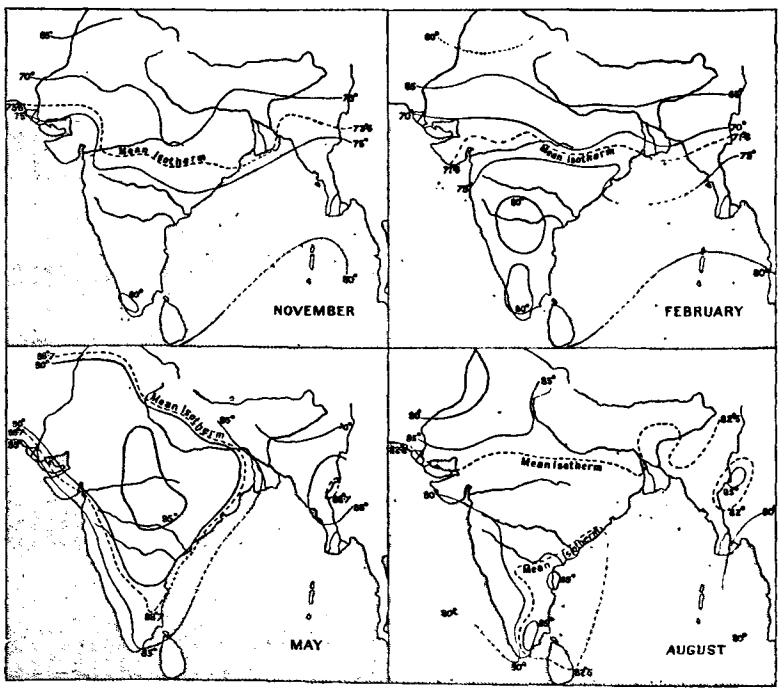

FIG. 1

the Peninsula and of Burma, but in north-west India increases to amounts varying between 2 and 5 inches in the submontane districts. As a rule the first burst of true winter rainfall occurs in the fourth week of December.

Temperature is very unstable during this period, for each storm is, as a rule, preceded by a rise and followed by a fall of temperature. Temperature[1] sometimes diminishes from 20° to 30° in two days during the passage

[1] Degrees Fahrenheit are quoted throughout.

of a cold wave, and sharp frost may then occur in the plains, inflicting much damage on young trees and crops. Night temperatures ranging between 24° and 26° have occasionally been recorded in some places in the plains of the Punjab and Rajputana during such periods; while at Chaman (Baluchistan) the night temperature once came down to 0°, at Murree to 12°, and at Simla to 17°. The effects of these warm and cold waves are rarely felt to the south of the Satpuras.

Mean temperature, January and February.

In January the mean temperature in the plains of India ranges from about 78° in the extreme south to about 50° in the north Punjab; it increases in February to about 80° in south and central Madras and to about 55° in the extreme north. The coldest region during the period is the north of the Punjab and of the North-West Frontier Province, and here the night temperature averages about 43° and the day temperature 65° or 66°. In the Peninsula, on the mean of the period, temperature rises a little beyond 85° during the day, but does not sink lower than 60° at night.

The hot weather, March to May.

The principal feature of this period is the steady rise of temperature, chiefly in the interior districts. During March the mean daily temperature varies from about 65° round Peshawar and Rawalpindi and 70° in upper Assam, to a little over 85° in the Madras Deccan and the adjacent districts of Hyderabad; in April the temperature is highest (about 90°) round Berar and lowest in upper Assam and the vicinity of Peshawar (about 73°); while in May temperature decreases from about 93° in Central India and the Central Provinces to 78° in upper Assam. The increase is more rapid in the day than in the night temperature, and towards the end of May, which is usually the hottest period of the season, maxima ranging from 110° to 120° are recorded over north-west and central India. The highest temperature hitherto recorded in India is 126° at Jacobabad in upper Sind.

Wind system.

Owing to the sharp contrasts of temperature between the Indian land area and the surrounding seas, local sea and land breezes prevail in the coast districts. In the

interior of northern India the winds blow down the river plains and valleys, and the westerly winds in the Gangetic plain in April and May sometimes blow with great intensity and are of high temperature. The sea winds penetrate farther inland with the advance of the season and produce a steady increase of water vapour, but in conse-

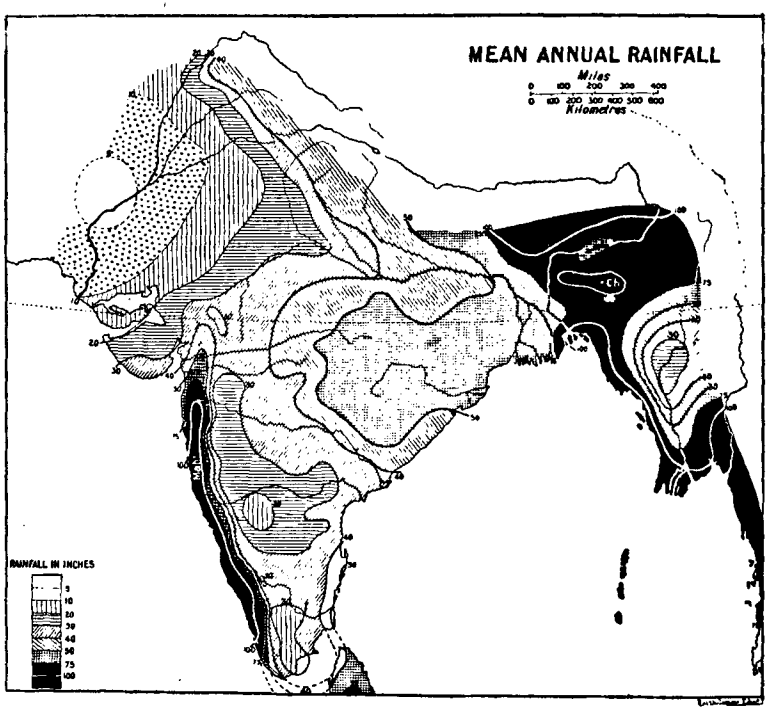

FIG. 2

quence of the rapid increase of temperature the relative humidity is low in the afternoon in April and May.

Rainfall.[1] As a rule disturbances of the cold-weather type do not affect the weather in India after the middle of March, and the precipitation of the hot-weather months is due largely to short-lived local disturbances such as dust-storms, thunderstorms, nor'westers, hailstorms, &c. In the drier districts the storms are usually rainless, but in the areas under the influence of the damp sea-breezes

[1] For rainfall statistics, see Appendix, pp. 487 seqq.

they are frequently accompanied with rain. In Lower Burma and Malabar temporary inrushes of moist winds from equatorial regions occur occasionally in May and produce much rain.

The total rainfall of the period March to May is less than one inch in amount in Sind, Rajputana, Gujarat, Khandesh, and Central India, and varies between 2 and 6 inches in the province of Bihar and Orissa, in the submontane districts of the United Provinces and of the Punjab, in the North-West Frontier Province, and over the greater part of the Peninsula. It exceeds 10 inches in Malabar, the eastern half of Bengal, Assam, and on the coast of Burma; being greatest in Assam and Tenasserim, where it is over 20 inches in amount.

The wet season.

The wet season may also be divided into two portions, the period of the south-west monsoon rains proper including the months of June, July, August and September, and the retreating south-west monsoon period comprising the months of October, November and December.

Advance of the south-west monsoon.

During the first three weeks of May unsteady winds prevail in the central parts of the Bay of Bengal and over the Arabian Sea, except in the vicinity of the surrounding land areas. Towards the end of May, when the weather is usually at its hottest in India, the south-east trades in the Indian Ocean extend almost abruptly northwards across the equator into the Arabian Sea and the south of the Bay of Bengal, and in the course of about two weeks become established over both seas as far north as their northern coasts. In most years this humid current, or the south-west monsoon, as it is called, appears on the west coast of India during the first five days of June, and on the Bengal coast about the middle of the month. From these seas the monsoon enters India in two main currents: that from the Arabian Sea after surmounting the Ghats blows across the Peninsula as a west, or in places as a north-west, wind, while the northern portion which crosses the Sind and Kathiawar coasts blows across Rajputana as a south-west wind. The current over the Bay is chiefly from the south-west; a part of it

passes over Burma and Assam towards the eastern Himalayas, and the remainder, after recurving, blows over Bengal and up the Gangetic plain. The volume of the Arabian Sea current is considerably greater than that of the Bay current. Ordinarily the monsoon is established over nearly the whole Indian region by the end of June. During the next two months damp sea

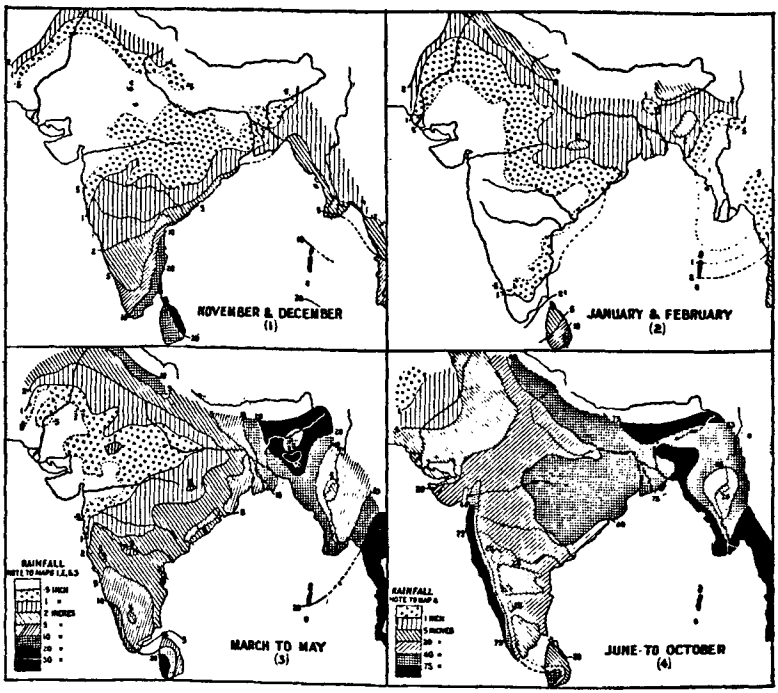

FIG. 3

winds blow fairly steadily across the whole country and carry rain to its farthest limits.

Rainfall of the wet season and its distribution.

The total rainfall in the plains of India amounts to nearly 7½ inches in June, 11 inches in July, and 10 inches in August. In September the activity of the monsoon and the accompanying rainfall begins to decline rapidly, and about the middle of the month the rainy season comes to an end in the greater part of north-west India; in north-east and central India the rainy season lasts

a month longer, but the rainfall during this interval is comparatively light. The average rainfall over the whole of India during September is 7 inches.

The total rainfall in the plains of India during the period June to September forms as much as three-quarters of the annual amount, but its geographical distribution is very uneven. Rainfall is very heavy, over 100 inches, on the west coast of the Peninsula south of Bombay and in the coast districts of Burma, but diminishes very rapidly towards the interior, so much so that at a distance of less than 75 miles from the coast it has fallen below 40 inches. Over the central parts of Burma it varies between 20 and 30 inches; in the Peninsula, excluding the zone of heavy fall along the west coast, between 5 and 30 inches; and in Central India, the Central Provinces, and the United Provinces from 25 to 50 inches. It averages about 64 inches in Assam, 55 inches in Bengal, and 45 inches in the province of Bihar and Orissa. In the dry zone of north-west India the rainfall decreases from about 20 inches on the eastern outskirts to barely 6 inches in Sind and the south-west Punjab.

Breaks in the rains.

The monsoon current even in an average year is by no means steady, so that periods of general rain alternate with intervals of dry weather. In most years there occur in northern India intervals of a week or more in which but little rain falls except in the coast districts, and in certain years these 'breaks' extend over several weeks and are characterized by the prevalence of dry westerly winds similar in character to the winds of the hot season. Thus in 1883 there was a break in north-west and central India from July 19 to the fourth week of August.

Storms of the season.

The monsoon is frequently ushered in by a cyclonic storm either in the Bay of Bengal or the Arabian Sea, and 'breaks' are, as a rule, terminated by the advance of a cyclonic storm from the Bay of Bengal into the interior. On an average about eight storms of moderate to considerable intensity cross from the Bay into India during the period June to September. Their paths

usually lie between west and north-west, and sometimes the storms travel right across Central India and either break up against the Himalayas or pass out into the Arabian Sea. On land they rarely give rise to stormy winds, and their chief importance lies in the heavy rainfall they distribute in the areas over which they pass.

In some seasons the storms succeed each other at the

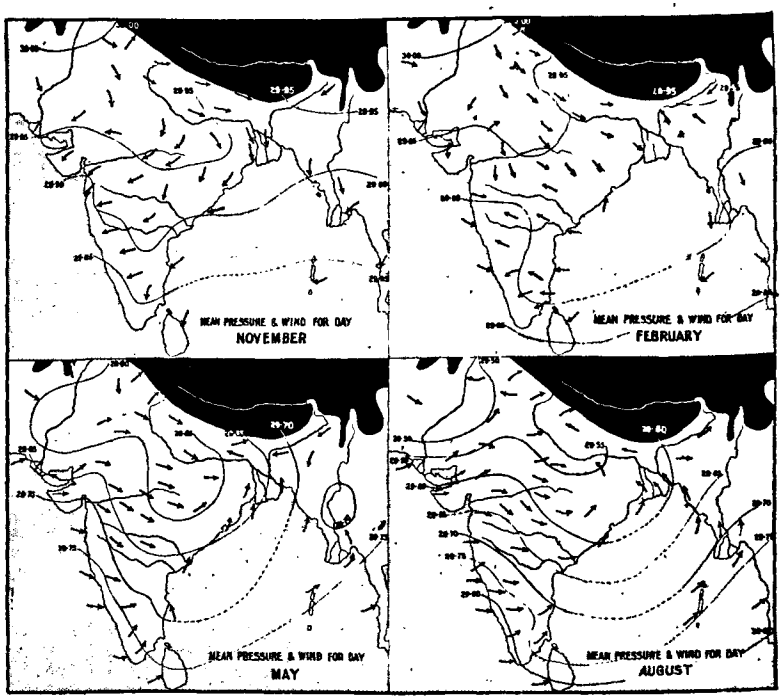

FIG. 4

rate of four or five in the month, and by concentrating the rainfall in the narrow belt of country traversed by them lead to drought conditions in the regions to the north and south. The storms thus play a great part in the economy of the season.

Temperature and humidity during the rains.

With the extension of monsoon conditions into the interior the heat moderates and the rest of the season is characterized by a remarkable uniformity of temperature. Thus over practically the whole of Burma, the

Peninsula, and central and north-east India, the mean temperature varies between 80° and 85°. In north-west India, which constitutes the hottest region, mean temperature ranges generally between 85° and 95° from June to August and between 80° and 88° in September. The diurnal range of temperature is fairly constant throughout, averaging nearly 20° in the north-west and between 10° and 15° over the rest of the country.

On the setting in of the monsoon in June a large increase of humidity takes place, particularly in the interior, and from July to September the percentage of saturation over a large part of the country exceeds 70°.

Droughts and famines.

Notwithstanding the fact that the seasons recur with striking regularity, the amount of precipitation received from year to year in the land area of India varies within surprisingly large limits. Thus since 1875 the annual rainfall of the Indian region, excluding Burma, has differed from the normal of 41 inches by more than 3 inches, or 7 per cent., on no less than fifteen occasions, while the extreme departures during the same period have been + 9 inches in 1893 and − 11 inches in 1899. Moreover, the variability of the rainfall is considerably greater in some areas than in others. As a rule rainfall is most precarious in the driest parts of the country and most regular in the wettest provinces.

Another important variation to which the rainfall in India is liable is the termination of the rains at an abnormally early date when rain is essential for the maturing or sowing of crops.

It is owing to these peculiarities in its rainfall that India is liable to droughts and famines. Sometimes these are so widespread and severe that famine relief has to be given to large masses of the population for periods varying from one to four years. For example, the famine of 1896–7 affected an area of about 225,000 square miles in British India, and a population of 62,000,000, and the State had to expend 727 lacs of rupees in the direct relief of distress. An idea of the frequency of these visitations may be formed by the fact that during

the last three decades of the nineteenth century no less than four severe famines devastated the country.

The areas where droughts chiefly occur in order of liability are: Sind and Cutch, United Provinces, Khandesh and Berar, Bihar, Hyderabad, Central India, Gujarat (excluding Cutch), Bombay Deccan, Mysore, Carnatic, Rajputana, Punjab, Orissa, and north Madras.

Retreating south-west monsoon rains, October to December.

During the period October to December the monsoon current extends gradually less and less far north, till by the third week of December it has withdrawn completely from the Indian region. Usually the rains terminate in the last week of September in the east of the United Provinces, about the middle of October in the Central Provinces, Bihar, and Chota Nagpur, and a week or two later in Bengal. In the rear of the retreating current land winds set in and gradually extend over the Arabian Sea and the Bay of Bengal.

The belt of low pressure which during the rains lies over northern India is transferred by the end of October to the south of the Indian region. The retreating current recurves round the eastern portion of this belt and extends westwards over the area to the north of it. The Bay current during its retreat gives rain chiefly to the Coromandel coast districts, and the Arabian Sea current to Malabar. In the interior of southern India the rainfall is comparatively light and less frequent. Lower Burma and the Bay Islands also receive occasional rain.

The complete withdrawal of the south-west monsoon from the Indian Seas coincides with or is followed soon after by the commencement of the winter rains in northern India.

Storms of the period.

In this season, as in the rainy season proper, rainfall is by no means continuous, and periods of rain alternate with periods of dry weather. Cyclonic storms are liable to appear in the Bay during intervals of dry weather and introduce monsoon conditions again. October above all is the month of most dangerous storms in the Bay. These are usually of small extent, and have an inner area in which winds of hurricane violence prevail. On

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PLATE V. KUDAN, KASHMIR

(Sir S. Eardley-Wilmot)

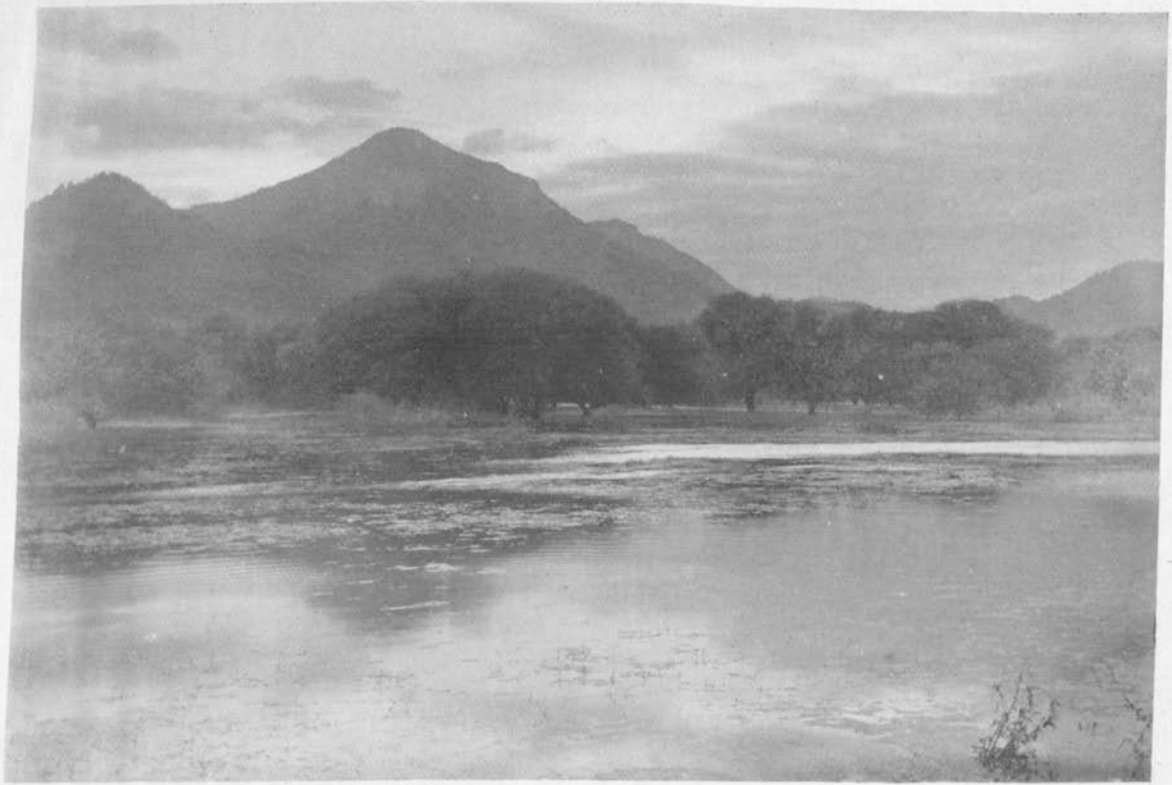

PLATE VI. MALAPURAM, MADRAS

(Sir S. Eardley-Wilmot)

striking the coast they may drive a huge mass of water over low-lying districts, and when the disturbance is aided by a high tide these districts may in a few minutes become covered with a sheet of water 20 to 40 feet in depth. The storm-wave accompanying the Bakarganj cyclone of 1876 was one of the most destructive on record; probably over a hundred thousand people were drowned in less than half an hour in the alluvial flats of the Megna, while an equal number died from epidemics of fever, &c., due indirectly to the storm-wave. Severe cyclones, however, are rare, occurring about once in five years.

During October and November the storms in the Bay advance either to some point on the north-east coast of the Bay or to the coast of Madras, while in December the great majority of them cross into the Peninsula.

Distribution of rainfall during the retreating monsoon.

The total rainfall of the period October to December in the Indian plains averages about 4½ inches. It amounts to about 15 inches in the coast districts of Madras, 7 inches in the Madras Deccan and Mysore, and 4 or 5 inches in Hyderabad and the Bombay Deccan. On an average about 9 inches occur in Lower Burma, and from 5 to 7 inches in Upper Burma, Assam, and Bengal. In the province of Bihar and Orissa the fall varies from about 7 inches on the Orissa coast to about 3 inches in the interior. In the remainder of the country, including the United Provinces, Central India, the Central Provinces, and the whole of north-west India, the fall is below 3 inches; and it decreases in a westerly direction till it reaches its minimum of barely half an inch in the desert region comprising the west of Rajputana, Sind, and the south-west of the Punjab.

Variations.

The rainfall of this period, like that of the rainy season proper, is subject to large variations from year to year, both as regards distribution and quantity. In certain years it occurs almost entirely in Burma and north-east India to the detriment of the Peninsula, or vice versa; sometimes the season ends abnormally early over the whole region, and in other years the activity of the current is greatly in excess or in defect of the normal.

Temperature and hygrometric conditions.

A general decrease of temperature occurs during this period, which is most rapid in northern India and smallest in southern India. In October the mean temperature is slightly above 80° in Gujarat, lower Sind, and the greater part of Madras and of Burma, and is between 70° and 80° in the rest of the country; in November it fluctuates between 60° and 75° in northern India and averages about 75° in the Peninsula and Burma. By the middle of December temperature has fallen to below 55° in the north Punjab, but is practically unchanged in the Peninsula.

The diurnal range of temperature is throughout the period greatest in north-west India (between 25° and 35°) and is smallest in the extreme south of the Peninsula, where it is below 15°. In Burma and north-east India it increases from about 15° in October to between 20° and 25° in December.

With the weakening and gradual retreat of the monsoon the amount of vapour in the air diminishes greatly all over the country, but owing to the rapid fall in temperature the relative humidity does not decrease to the same extent.

Thus while the vapour pressure over the land area falls from ·668 in October to ·437 in December the relative humidity varies only by a small amount from 70% in October to 65% in November and 64% in December. Throughout the period the driest region is the west of Rajputana and the adjacent districts of Sind and Gujarat with a humidity of about 40%, and the dampest is upper Assam, where the humidity is as high as 87%.

The Chief Natural Climatic Divisions

From the purely climatic standpoint the empire may be divided by various methods into tracts which may be called 'natural divisions' possessing distinctive features, though in some cases the boundary line is not well marked. The following paragraphs contain a short account of eight 'natural divisions' of this type.

1. *Assam, Bengal, and Burma*

Except for occasional light rain in the northern parts, the period November to March is practically dry. Thunder showers occur in April and May, which in the first half of June become merged in the monsoon rainfall. The rainy season lasts up to about the middle or end of October. The annual rainfall varies between 50 and 100 inches over a large part of the tract, and on the Burmese and east Bengal coasts considerably exceeds even 100 inches. At Cherrapunji (elevation 4,300 feet), which is exposed to the south-west wind from the Bay, the annual fall amounts to over 400 inches. In the centre of Burma there is, however, a zone where only 20 to 30 inches fall during the whole year. Except in the dry zone of Burma the air is very damp during the greater part of the year, and from May to October dense cloud covers the sky. Temperature is moderately high, the mean maximum for the year ranging from about 83° in upper Assam to over 90° in central Burma, and the mean minimum between 68° and 73°. The diurnal range generally is only about half of that in the north-west dry area.

2. *The Gangetic Plain, and the Central India Plateau (Bihar, Chota Nagpur, the United Provinces, Central India, and the Central Provinces)*

The only period of the year characterized by really wet weather is from about the middle of June to the middle of October, the period of the south-west monsoon. Occasional rain is received during the winter months from the cold-weather storms, but it is only light. From April until the beginning of the monsoon the tract is swept by hot and excessively dry westerly winds, and temperatures ranging between 110° and 120° are occasionally recorded. The withdrawal of the monsoon is succeeded by the prevalence for eight or ten weeks of pleasant fine weather with a decreasing temperature.

During the first three months of the year large fluctuations of temperature occasionally occur in connexion

with the passage of cold-weather storms, and in the United Provinces the thermometer at night may then sink to 29° or 30°. The diurnal range of temperature exceeds 20° during the dry season and is about half that amount during the rains.

3. *The Himalayas (including Kashmir and the Hill Districts of the North-West Frontier Province)*

Precipitation occurs chiefly in the first three months of the year and from June to September or October. The summer monsoon discharges heavy rain on the face of the Himalayas, but does not penetrate to any appreciable extent into the interior, hence on the inner ranges the winter is the season of greatest precipitation. Precipitation decreases in amount from east to west, being 124 inches at Darjiling, 95 inches at Naini Tal, 71 inches at Chakrata, 64 inches at Simla, 56 inches at Murree, 27 inches at Srinagar, and 26 inches at Parachinar: it is only 3 inches at Leh and 5 inches at Gilgit. At Darjiling the sky is more or less clouded during the greater part of the year, but at stations in the western Himalayas skies are generally clear in May, October, and November. The air is very damp throughout in the east, but at the western Himalayan stations and in the hill districts of the North-West Frontier Province there is not much moisture in the air in April and May, and after the rains from October to December. In the valley of Kashmir, as represented by Srinagar, the mean monthly values of the percentage of saturation vary between 78 and 85. At elevations of 6,000 to 7,500 feet in the Himalayas the coolest month is January with mean temperature between 40° and 43°, and the warmest June (except at Darjiling) when temperature ranges between 67° and 73°. In Kashmir temperature varies considerably from station to station: at Leh it ranges between 17° in January and 63° in July, at Srinagar between 31° in January and 73° in July, and at Dras between 4° in January and 64° in August. At Darjiling the highest mean temperature (62°) occurs in July. The thermometer in the afternoon seldom rises

beyond 91° at stations in the west of the Himalayas and at Darjiling beyond 80°.

During the winter temperatures well below the freezing-point are very often registered in the early morning in the hilly tract of Kashmir, but only occasionally occur in the Himalayas and the hills of the North-West Frontier Province.

4. *North-West Dry Area (the plains of the Punjab, and North-West Frontier Province, Sind, Rajputana, and Gujarat)*

This is on the whole the driest region in India, and is subject to extremes of heat and cold. Here the rainy season is very short, in the Punjab lasting only from about the end of June to the middle of September, while in Gujarat and Rajputana it is somewhat more prolonged. Occasional rain is received in the first three months of the year, but its average amount is less than fifteen per cent. of that recorded during the prevalence of the summer monsoon. The total rainfall of the year is less than 5 inches round Jacobabad, 21 inches in Rajputana, 35 inches in Gujarat, and 21 inches in the Punjab. Although on the mean of the year the hottest area in India lies over south and central Madras, the highest temperatures in India are recorded in the north-west dry area between June and September. June is the hottest month, with a mean temperature of 91° and an average of 104° in the afternoon; the absolute highest on record varies between 115° and 126° in the different districts. From December to February the northern half of this region is the coolest in India. January has a mean temperature of only 59° and a mean minimum of 47°, and except in the maritime tract represented by lower Sind and Gujarat temperatures of 25° to 31° in the early morning are not unknown.

The diurnal range of temperature is very large on the average of the year and amounts to over 30° in upper Sind.

5. *Baluchistan*

The annual rainfall over this area is 8 inches, and only one-fourth of this is contributed by the south-west monsoon. The annual mean temperature of Chaman is 67° and of Quetta 59°. In June, the warmest period of the year, the thermometer in the afternoon has once or twice during the last forty years risen to 112° at Chaman and 102° at Quetta. During the winter, when snowstorms occur and are followed by waves of cold, very low temperatures are recorded, the lowest yet observed being 0·2° at Chaman and 3° at Quetta. As is ordinarily the case in dry regions, the range of temperature, both daily and annual, is very large.

6. *The West Coast (south of Gujarat)*

The climate of this tract is exceedingly damp and uniform. The wet season lasts from about April to November in the south (Malabar) and from June to October in the north. The annual rainfall is 75 inches at Bombay, but it increases southwards and is over 100 inches generally along the coast below the latitude of Ratnagiri. It is much heavier on the Ghats. The mean temperature for the year is 79° or 80°; and nowhere do the monthly values fall below 74°. In Malabar the mean temperature of July is 6° or 7° lower than that of April, while in the Konkan the warmest month is May and the coolest January. At Mercara (elevation 3,781 feet) the mean temperature is 68°, with a difference of only 8° between the warmest and the coolest month.

7. *The East Coast of the Peninsula*

This region is very dry as compared with the west coast. The average annual rainfall, however, exceeds 40 inches except in the portion from Cocanada to Nellore, where it varies between 30 inches and 40 inches. In the north the rainfall occurs chiefly from July to October and in the south from October to the middle of December, when the monsoon current is backing down the Bay. The mean temperature of the year is 81°, which is some-

what higher than that of the west coast. The hottest month is May with a mean temperature of 88°, and the coolest January, 74°. Unlike the west coast the tract from Cocanada southwards is exposed to the hot winds from the interior, and very high temperatures (between 108° and 118°) are occasionally recorded during the period from April to June.

8. *The Interior of the Peninsula (Berar, the Deccan, Mysore, and south Madras)*

This zone is much drier than the west coast. Its annual rainfall is less than 40 inches, and in a strip parallel with the Ghats and extending from the Tapti valley southwards to near Bangalore it is still less, between 20 inches and 25 inches. In the north the rainfall occurs chiefly between June and October, but in the south the rainiest season is from October to December, although a fair amount of precipitation is also received from thunderstorms in April and May.

The vicissitudes of temperature are much smaller than in the extra-tropical regions, and the large and sudden variations which characterize northern India during the winter months are practically unknown. As a rule the coolest month is December and the warmest May (except on the tableland of Mysore, where it is April), but the amplitude of the change is everywhere less than 20°, or barely half of that in the Punjab.

The mean maximum of the year varies between 83° and 96° and the minimum between 62° and 77°.

Hot land winds prevail in the spring, and very high temperatures, occasionally ranging up to 105° and beyond, are recorded, except on the plateau of Mysore.

The climate of the Nilgiri Hills is very enjoyable throughout the year. At Ootacamund, the summer residence of the Madras Government, the mean temperature of the year is 57°, which is only 4° below that of April and May, the warmest months, and 3° above that of December and January, the coldest. The afternoon temperature varies between 62° in July and 71° in April,

and the highest hitherto on record is 77°. The mean night temperature of the year is 49°, and does not vary by more than 5° or 6° during the course of the year. In 1880 a reading as low as 25° was observed.

The mean rainfall for the year is 56 inches, distributed over 105 days, and of this no less than 44 inches occur from May to October.

Climate and Weather of the Provinces

Burma. The climate of Burma is by no means uniform. In Lower Burma the annual rainfall averages about 123 inches, but it varies from about 50 inches in the district of Prome to over 175 inches on the Tenasserim and Arakan coasts. The air is very damp in the coast districts almost throughout the year, and in the interior from May to January. The mean temperature of the year is about 79° all over Lower Burma, that of the warmest month, April, being 84°, and of the coolest, January, 74°. The highest temperatures yet recorded have varied between 98° and 108°, and the lowest between 43° and 62°.

In Upper Burma the yearly rainfall is only 42 inches, or about one-third of that in Lower Burma. To this aggregate the four months June to September contribute over 28 inches, May and October about 10 inches, and the period November to April only 3 inches.

The extreme north of Upper Burma, including the districts of Upper Chindwin, Bhamo, and Myitkyina, constitutes the rainiest region with an annual fall of 73 inches, while the zone of minimum rainfall (27½ inches) is situated over Minbu, Myingyan, Kyaukse, and Sagaing.

The mean humidity of the year in the morning hours is about 80, and in the driest month, March, it falls to between 48 and 54 in the area round Mandalay and Taungyi. From June to December it exceeds 75 everywhere. In the north, as represented by Bhamo and Kindat, the air is almost saturated with vapour during nearly the whole year. The mean temperature of the year at the low level stations of Upper Burma is nearly uniform between 75° and 81°. The temperature of the coolest month, January, is 67°, and that of the warmest, April and May, 86°. Even in the winter the night temperature at the level of the plains rarely falls below 40°. In April, the last month of the dry season, the afternoon temperatures vary between 94° at Bhamo and 103° at Minbu and Thayetmyo, and no reading exceeding 114° has yet been recorded at the observing stations.

Assam. The climate of Assam is notoriously damp throughout the year. The humidity at 8 a.m. averages 90 per cent. of saturation, and in no month does it fall below 75. The sky

is seldom clear. In the cold season thick fogs prevail, and rainfall is of occasional occurrence during the passage of cold-weather storms across north-east India. Thunderstorms occur occasionally in March, and frequently during the succeeding two months, and in June merge imperceptibly into the monsoon rainfall, which lasts until October. Little rain falls during the next two months; December, in fact, is the driest month of the year.

The total rainfall recorded during the year over the province as a whole amounts to 100 inches, and of this nearly 78 inches fall from May to September. It exceeds 100 inches in Sylhet and Cachar and at the foot of the Himalayas, and is comparatively light along the southern margin of the Brahmaputra, particularly in the district of Nowgong, where it is only 71 inches. At Cherrapunji in the Khasi hills the average for the year is over 400 inches, and even in the plains of Cachar and Sylhet some places record over 200 inches.

Temperature is moderately high and fairly equable, ranging from 77° at Silchar to 76° at Dhubri and 74° at Sibsagar. The coolest month is January with a temperature of 63°, and the warmest July, when the mean temperature averages 83°. The average maximum temperature of the year is 84°, and no reading higher than 104° has ever been recorded. The mean lowest of the year is 66° at Sibsagar and 68° at Dhubri and Silchar, and nowhere in the plains has temperature fallen below 37°.

Bengal.

Bengal, while exposed to moist winds from the Bay during at least three-fourths of the year, is almost out of the reach of hot winds which blow down the Gangetic plain in April and May. Its climate is accordingly very damp and relaxing, more like that of Assam, and the reverse of that of north-west India. The cold season lasts from December to February; thereafter sea winds begin to blow from the head of the Bay, and during April and May give rise to frequent thunderstorms and nor'westers.

The rainy season proper begins in the middle of June and terminates at the end of October. The rainfall is irregularly distributed. Thus the average annual fall ranges between 50 and 75 inches in the south-west, centre, and west, and between 75 inches and 120 inches in most places in the south-east, east, and north. It is still heavier in and near the hills, where Buxa has 209 inches, Nagrakata 156 inches, and Kurseong 161 inches. The rainfall is also higher near the coast than on the plains farther inland. Thus Saugor Island has an average of 73 inches, and Calcutta of 61 inches.

The lowest rainfall in the province is that of the Bankura and Murshidabad districts, where the annual fall averages 55 inches. Of the rainfall reporting stations only Patkabari has an average of less than 50 inches.

The mean relative humidity is high and fairly equable at

all the stations excepting Burdwan, where it averages 71 per cent. of saturation, and remains between 57 and 77 from October to May. In other parts of the province it ranges between 83 and 88, and rarely falls below 75 per cent. in any single month.

The annual mean temperature varies between 79° at Burdwan and 74° at Jalpaiguri in the extreme north. January is the coolest month with a mean temperature of 64° and mean maximum temperature of about 77°. In the maritime tract the thermometer never sinks below 39°, while in the submontane parts the lowest reading yet recorded is 34°. The average afternoon temperature of the hottest months, April and May, is 90° and upwards in all parts of the province, except along the foot of the hills and in the extreme south-east as represented by Chittagong. In the central and western districts, which occasionally come under the influence of the hot winds down the Gangetic plain, the afternoon temperature averages about 100° in April and 97° in May, and the highest temperatures yet recorded are 117° at Midnapore and Bankura, and 114° at Berhampore.

The establishment of the monsoon in June produces a moderate fall in the day temperature, but not till the end of October does the afternoon temperature range below 86°. The nights are on the whole hottest in July; but temperature varies very little from that month to October, after which it falls rapidly.

Bihar and Orissa.

During the first two months this area receives occasional light rain from winter depressions. Precipitation is heavier during the next three months, but more especially in May, and is associated with thunderstorms and hailstorms. The monsoon rains appear about the middle of June and last till the middle of October in Bihar and Chota Nagpur and three or four weeks longer in Orissa. The rest of the year is practically dry.

The annual rainfall averages nearly 58 inches in Orissa, 53 inches in Chota Nagpur, and 50 inches in Bihar. Speaking broadly, about 90 per cent. of the total fall is received from the monsoon, which lasts practically from June to October, and only about 10 per cent. during the remaining seven months. The driest month in the year is December with only 18 cents of rain, and the rainiest is July with an average fall of about 13 inches. The districts of Purnea, Cuttack, and Sambhalpur are those of heaviest rainfall. Their normal annual is 72 inches, 60 inches, and 58 inches respectively, and in a few places exceeds 75 inches. The region of lowest rainfall is defined by the Shahabad, Gaya, and Saran districts, where the average annual fall is a little over 43 inches. Rainfall is very regular in its incidence in Chota Nagpur, but is comparatively precarious in Bihar and Orissa, and severe droughts are of occasional occurrence there.

On the mean of the year the humidity is lowest on the high ground of Chota Nagpur and thence increases both northwards and southwards, being greatest on the coast of Orissa. On the coast the variation during the year is small, the monthly values of humidity at 8 a.m. varying between 89 and 78, but at the inland stations the range is large: thus the average humidity at Hazaribagh varies from 35 in April to 89 in August, and at Patna from 49 in March to 87 in August. In Bihar, as in Orissa, the relative humidity during the dry season from November to February, notwithstanding the small quantity of vapour in the air, is almost as high as during the rains.

The mean annual temperature varies from 80° at Cuttack to 74° at the elevated stations of Hazaribagh and Ranchi. Over practically the whole province May is the warmest month with a mean temperature between 84° and 93°. On the setting in of the rains in June there is a slight fall, and during the next three months the readings range between 77° and 84°. A comparatively rapid fall occurs during the next three months, with the result that the December temperature nowhere exceeds 69°, while in Bihar and Chota Nagpur it is generally below 63°. In Orissa and Chota Nagpur December is the coolest month of the year, but in Bihar the January temperatures are slightly lower than those of December. The highest afternoon temperatures are generally recorded in May in Orissa, Chota Nagpur, and the south of Bihar, but in April in the northern half of Bihar, where the heat of May is somewhat mitigated by the moist easterly winds that are felt intermittently. They vary between 95° and 105° in Bihar, between 99° and 105° in Chota Nagpur, and between 91° and 107° in Orissa. The absolutely highest afternoon temperatures yet recorded vary between 109° and 118°. The night temperature of the coldest months, December and January, averages about 51° in Bihar and Chota Nagpur and 57° in Orissa, and has never fallen below 34° in the former area and 40° in the latter.

The United Provinces.

From about Christmas to the middle of March the United Provinces lie within the zone influenced by the winter storms, which produce light to moderate precipitation, more especially along the hills. Thereafter dry, hot west winds set in and continue, though somewhat unsteadily, until the second or third week of June. The monsoon arrives in the second fortnight of June and holds till the end of September or the first part of October. As a rule fine weather with clear skies obtains till near Christmas, when the winter rains begin.

Notwithstanding that the westerly current is exceedingly dry the period of its prevalence is regarded as the healthiest in the year. Moist easterly winds appear at intervals and give rise to thunderstorms, particularly in the submontane and hill districts.

The annual rainfall of the province is 40 inches, and of this only 10 per cent. falls during the period October to May. In the plains it is heaviest in the Pilibhit district (51½ inches), and lightest in the region comprising the districts of Agra, Muttra, Aligarh, and Bulandshahr, where it averages 26 inches. Large fluctuations occur from year to year, and it is owing to this that the province is so liable to droughts. The atmosphere is damper than in the regions further west, the mean humidity for the year being 61 per cent. of saturation. August is the dampest month with a humidity of 83 and April the driest with 36.

The mean annual temperature of the year varies between 79° at Jhansi and 70° at Dehra Dun. The mean of January, the coolest month, is 58°, and that of May, the warmest month, 90°. The afternoon temperature of May ranges from 95° at Dehra Dun to 108° at Jhansi and 107° at Allahabad, Mainpuri, and Agra; and the morning minima in December and January vary from 43° at Roorkee to 51° at Jhansi. The absolute highest temperatures yet recorded vary between 111° at Dehra Dun and 120° at Agra, Benares, and Allahabad, and the lowest between 28° at Roorkee and 37° at Jhansi.

Punjab

The Punjab is subject to extremes of cold and heat. It has three well-defined seasons. During the cold season, which extends from December to March, weather is disturbed at intervals and moderate rain then falls in the plains with moderate to heavy snow in the hills. The disturbances are as a rule preceded by a rapid rise of temperature and succeeded by a large fall, and from time to time temperatures several degrees below the freezing-point are recorded even in the plains.

The hot season begins in April and lasts to nearly the end of June. Hot, dry winds prevail during the afternoon, and in May and June temperatures from 110° to 120° are recorded. The intensity of heat is relieved at intervals by the occurrence of series of duststorms and thunderstorms which are sometimes accompanied with rain. The monsoon rains set in towards the end of June and last till the middle of September. From October to near Christmas the weather is dry and temperature falls rapidly. This is in fact the most pleasant part of the year in the Punjab.

The total rainfall of the year amounts to about 24 inches in the east and north, and is less than 9 inches in the south-west. The districts of Dera Ghazi Khan, Muzaffargarh, and Multan have only about 6 inches during the whole year and constitute the driest region. About 70 per cent. of the total rainfall is received during the period June to September. The air is drier than in the United Provinces, the annual mean being only 57 per cent. of saturation. In the driest month, May, the humidity is as low as 41, and for short periods has been known to fall much lower. The dampest

month is August, but in January, July, and September the humidity is almost equally high.

The mean temperature of the year is 75°, that of June 93°, and that of January 54°. The mean maximum temperature of the year over the province is 89°, the mean minimum 63°, the highest yet recorded 122°, and the lowest 24°.

North-West Frontier Province.

In virtue of the large differences in the topographical features of the various parts of the North-West Frontier Province the climate is far from uniform. The annual rainfall varies between 8 inches at Kulachi in the Dera Ismail Khan district and 47 inches at Abbotabad; the average for the province as a whole is 16 inches, of which 7 inches, or nearly a half, falls between December and May inclusive. The air is even drier than in the Punjab, the mean humidity of the year measured at 8 a.m. being only 53 per cent. of saturation and that of May 39. Humidity is highest in August (62), but the July, September, December, and January values are nearly as high. The mean temperature of the year is 75° at Dera Ismail Khan and 4° lower at Peshawar. June is the hottest month with a mean temperature of 93° and a mean maximum of 107° in the afternoon. The mean of December and January is 53° and that of the early morning 40°. The highest temperature yet recorded is 121·5° and the lowest 24·7°.

Sind.

Sind is on the whole the driest and hottest part of India. The average rainfall of the year is about 6½ inches, of which 5½ inches fall from June to September. In the maritime tract the annual humidity is as high as 71 per cent., but away in the interior at Jacobabad it is only 46. As in the Punjab the dampest month is August, but the greatest dryness occurs in December. In lower Sind the mean temperature varies between 64° in January and 89° in June, and averages 79° for the year. The maximum temperature is on an average 94° at Karachi and 107° at Hyderabad, the highest temperatures on record being 118° and 122° respectively. The mean lowest of the year is 53°, and no reading lower than 33° has yet been recorded. In upper Sind the mean temperature of the year is 79°, that of the warmest month 98°, and that of the coolest 57°. The mean night temperatures range from 43° to 84° in different months and the mean day temperatures from 74° to 113°. The highest temperature yet recorded is 126° and the lowest 25°. The annual diurnal range of temperature decreases from 30° at Jacobabad to 17° at Karachi.

Rajputana.

In Rajputana, as in the Punjab, the year may be divided into three well-defined seasons, but the winter is not so cold and wet, and terminates several weeks earlier; in the hot season temperature is on the whole higher and in the rainy season lower. Strong westerly winds from the coast of Sind and Kathiawar blow across Rajputana through the summer months, making the atmosphere less oppressive than the

almost stagnant air in the Punjab. Rainfall is scanty in the west of the province, varying between 4 inches and 22 inches and averaging 12 inches. In east Rajputana the annual fall amounts to 24½ inches, and in several places exceeds 35 inches; on the Aravalis, as represented by Mount Abu, it is over 60 inches. Over 90 per cent. of the total fall occurs during the rainy season from June to September, but even this is very precarious. The air is dry, the average humidity of the year being only 44 at Bikanir, 48 at Pachpadra, 52 at Jaipur, and 55 at Ajmer.

The mean annual temperature varies between 75° at Ajmer and 80° at Bikanir and Kotah. The mean temperature of the coolest month, January, is 59°, that of the warmest, May, 92°. In May the morning minima average 81° and the afternoon maxima 106°. In January they are respectively 48° and 75°. The absolute highest temperature hitherto on record is 123° and the lowest 24°.

Central India.

In Central India there are only two distinct seasons, the dry season and the wet season.

The dry season begins in the first half of October and lasts until the second week in June. Occasional light rain occurs during the period, being associated in January and February with winter storms and from March to May with duststorms and thunderstorms. The total precipitation of the eight months October to May equals 4½ inches in the east and 2 inches in the west. Dry westerly winds prevail during the spring months.

During the wet season the rainfall is fairly heavy, amounting to 41 inches in the eastern states and over 32 inches in the western. Humidity is lowest in April (26 per cent.) and highest in August (83 per cent.). The humidity values for the year range from 48 at Neemuch to 59 at Nowgong.

The mean annual temperature as derived from the data of Nowgong, Sutna, Neemuch, and Indore is 76°. In May, which is the warmest month, the early morning minimum temperature averages 78° and the afternoon maximum 105°; while in the coolest month, January, the afternoon average is 77° and that of the early morning 48°. The extremes of temperature are represented by 117° and 30°.

Central Provinces.

The climate of the Central Provinces is akin to that of Central India. The total rainfall recorded during the year is a little over 41 inches, and of this 37 inches fall in the rainy season from June to September, 2½ inches from October to December, and nearly 2 inches during the first five months of the year. It is lightest in Berar (31 inches) and heaviest in the region including the districts of Chanda, Bhandara, Narsinghpur, Balaghat, Seoni, Mandla, and the Feudatory States, where it exceeds 50 inches. The mean annual humidity is 56 per cent. In April and May, when hot westerly winds prevail, the percentage of saturation is only 29, but with the

setting in of the rains in June a rapid increase in humidity occurs, and during the next three months the air is almost saturated.

The mean temperature for the year ranges from 80° at Chanda and Amraoti to 75° at Seoni. December is the coolest month, with a mean temperature of 65° and mean maximum temperature of 80°, and a mean minimum temperature of 52°. The hottest month is May, with a temperature averaging 94° during the day, rising to 107° in the afternoon and falling to 80° in the early morning. The extremes of temperature hitherto recorded are 119·5° and 32°.

Bombay. Bombay, like Madras, is characterized by much diversity of climate. In the coast districts of Konkan, which is shut off by the Ghats from the land winds, the mean temperature for the year varies between 78° and 80°, the mean maximum between 86° and 88°, and the mean minimum between 73° and 75°. The diurnal range of temperature is small, less than 10° in the wet season June to September, and ranges between 14° and 22° from November to February. Nowhere on the coast has a temperature exceeding 102° or lower than 53° been recorded. In the Bombay Deccan the mean temperature fluctuates between 69° in December and 85° in May. The mean afternoon temperature for the year averages 89°, but in the hot weather months March to June maxima of 108° to 114° are occasionally recorded. The early morning temperature ranges from 55° in December to 73° in May, and has never been known to fall below 34° anywhere. In Gujarat the mean temperature for the year is 80°, that of January 69°, and that of May 89°. The average maximum temperature of the year is 92° and the minimum 69°; and from March to June maxima exceeding 110°, and in May and June as high as 119°, are occasionally registered in places away from the coast. At night nowhere does the thermometer sink to the freezing-point, and except at Deesa, Ahmadabad, and Rajkot has never fallen below 40°.

Humidity is fairly high on the coast (between 74 and 80 per cent.), and decreases thence into the interior to 46 at Deesa and 51 at Sholapur. The air is exceedingly dry over the greater part of the Bombay Deccan in March and April, particularly in the afternoon, when humidities below 20 per cent. are recorded. The annual rainfall is nearly 113 inches at the coast stations of the Konkan, and is much heavier on the Ghats where, near Lonavla, it approaches that of Cherrapunji. In the Bombay Deccan, however, the annual rainfall averages only 32 inches and in Gujarat 35 inches. Except at the southern extremity but little rain falls from the end of October to the end of May, the first three months of the year being especially rainless.

Hyderabad. Hyderabad lies quite beyond the influence of winter storms, and the weather there is accordingly almost rainless from

December to February. Thunderstorms occur sometimes in March and April and more frequently in May. From June to September a strong wind from the west blows steadily across the plateau, but it does not produce much rainfall. In October the westerly current yields place to easterly winds from the Bay, and the latter in conjunction with cyclonic storms occasionally produce heavy though local falls of rain. The rainy season is thus more prolonged than in northern and central India. The average annual rainfall of the state is 32 inches, but in the southern portion, including the districts of Raichhur, Nalgonda, and Lingsugar, it is 27 inches or less.

The mean humidity of the year at 8 a.m. is 65; that of the driest months, March and April, 50; and that of the dampest, August and September, 80.

Hyderabad is rather warmer than the Central Provinces. Its mean annual temperature is 81°; the mean monthly temperature ranges from 72° in December to 91° in May. Between July and October it varies between 78° and 83°. In April and May the temperature rises on an average to 103° or 104° in the day-time, and sinks to 76° or 77° in the early morning. In December and January the mean night temperature varies between 57° and 63°, and the afternoon between 82° and 87°. Temperature has never been observed below 36° or above 117°.

Mysore. The climate of Mysore differs in some respects from that of Hyderabad. The dry season does not outlast March, and in April and May heavy showers occur giving an aggregate of 5 inches of rain in the two months. The rainfall of the rainy season, June to September, is on the other hand appreciably lighter than in Hyderabad, and that of October and November heavier. The average rainfall for the year is 36 inches, of which 23 inches fall from June to September and 8 inches between October and December, while only about half an inch occurs from January to March. The region of greatest annual rainfall is round Shimoga and Kadur, and that of least rainfall round Chitaldrug (21 inches). Places in and near the Ghats, such as Nagar, Tirthahalli, Koppa, Mudgere, and Sringeri receive upwards of 100 inches during the year. The air is damper than in Hyderabad, the mean 8 a.m. humidity for the year being 75. Except in the part represented by Chitaldrug the percentage of humidity at 8 a.m. exceeds 70 in all months with the exception of February and March. The mean temperature of the year varies from 71° at Hassan to 75° at Chitaldrug. As is usually the case in regions near the equator the difference between the temperatures of the winter and summer months is small, not exceeding 13°. In April the highest afternoon readings average 93°, but the absolute highest temperatures are not higher than between 99° and 103°. The lowest night temperatures on record vary between 42° and 52°.

Madras.

As might be expected from its situation Madras exhibits great contrasts of climate. Thus in Malabar, on the north-east coast and in the Madras Deccan the chief period of rainfall is from June to October, while in the Carnatic the rainfall of October to December is considerably heavier than that of June to September. The dry season does not as a rule survive March in Malabar, but on the north-east coast of Madras and in the Madras Deccan it is prolonged into the earlier part of May. The rainfall of the year as a whole averages 40 inches on the north-east coast, 25 inches in the Deccan, 36 inches in the south-east of the province, and 129 inches in Malabar.

The mean humidity of the year exceeds 70 per cent. in the coast districts and is below 60 per cent. round Bellary. In Malabar the dampest month is July and on the north-east coast September, while over the rest of the presidency it is either October or November. The greatest dryness, on the other hand, occurs in January in Malabar, in March in the Deccan, and in June or July in the Carnatic. The mean temperature for the year is a little over 80° in almost all places with the exception of Malabar, while that of December and January is 75°, and that of May 87°. In Malabar the April temperature is a trifle higher than that of May. Throughout the year the average afternoon maximum is above 80° and the night minimum above 60°; and the former exceeds 100° from March to May in the Madras Deccan, and in May in the coast districts from Nellore to Cocanada in addition to the neighbourhood of Madura.

From March to June the heat is excessive during the day-time in the coast districts south of Cocanada, as well as in the Madras Deccan; and temperatures varying between 110° and 118° are occasionally recorded during May and June.

(For rainfall statistics, see Appendix, p. 487 *seqq.*)

2. The Causes of the Monsoons

By Gilbert T. Walker

The word monsoon is in general applied to any winds that are more or less persistent through whole seasons, but in India its application is usually limited to the 'south-west' and the 'north-east' monsoons: the former giving rain over nearly the whole Indian area between the first half of June and the middle of October, and the latter giving rain chiefly in the east and south of the Peninsula from that time until the end of the year. In view of the great importance of the rainfall due to the

south-west monsoon, the rainfall itself, not the wind, is frequently called 'the monsoon'.

The south-west monsoon.

As is well known, the greater heat over the equator tends to make the air in that region expand, become lighter, and rise; and the air is drawn in to take its place from the belts to the north and south extending nearly to 25° from the equator. Owing to the rotation of the earth any point on the equator is moving eastwards at the rate of about 25,000 miles a day, or about 1,000 miles an hour; while the rotation will produce no eastward velocity at the north and south poles. At intermediate places intermediate velocities will obtain; and hence when air is drawn northwards to the equator from a region in 25° S. lat., where the eastward velocity of the earth is only about 900 miles an hour, it will as it approaches the equator lag behind more and more in its eastward movement. Instead, therefore, of being a southerly wind it will be a south-easterly wind. Similarly for the belt to the north of the equator; and these two winds, which blow over a large part of the year, are called respectively the south-east and north-east trades. In the neighbourhood of the equator the moisture-laden air brought up by the trade-winds is forced to rise and so expands and cools; it can no longer contain as vapour the moisture that it held when near the sea-level, and the moisture is deposited as rain. The equatorial region is thus, in general, characterized by light winds, great humidity, and frequent rainfall.

Temperature of land and sea.

Now the temperature of a land area rises much more under the heat radiated by the sun than does the temperature of the sea. Thus in July the mean daily air temperature in the Indian Ocean is about 77° near the equator, but averages about 82° over the Indian Peninsula, in spite of the cooling produced by rain, and as we pass to the desert regions of Sind, Baluchistan, Persia, and Arabia the mean temperature rises to about 95°. During the summer months, therefore, the region of greatest heat and so of greatest ascensional movement between 40° and 90° E. long. is no longer over the equator, but is

roughly between 20° and 30° N. lat.; and it is accordingly to this region that there is a powerful indraught of air from the surrounding region. The ascensional movement and rainfall in the equatorial region are greatly diminished; the moisture-laden winds flow north-westwards from the South Indian Ocean in 25° S. lat., turn northwards as they cross the equator, and north-eastwards (under the influence of the earth's rotation) as they cross the Arabian Sea and Bay of Bengal. The latter portion of the monsoon current is forced by the Burmese hill-chains into a northerly direction, and a part of it, being drawn westwards by the indraught towards the heated area and partly forced westwards by the Himalayas, travels under normal conditions up the Gangetic plain. The Arabian Sea monsoon current continues to curl eastward under the influence of the earth's rotation, and sweeps across India until it meets that portion of the Bay current that flows up the Gangetic plain.

Effect of the Himalayas.

The part played by the Himalayas is of considerable importance. They largely isolate India from the regions to the north, and so during the monsoon prevent the demand for air to supply the indraught from being satisfied by winds from Central Asia; but for this the winds from the Indian Ocean would be much less strong than they are. That the Himalayas do not form a complete barrier, however, is shown by the rain and snow which are carried in appreciable quantities by the monsoon currents into Kashmir and Tibet.

The north-east monsoon.

After September the region of chief indraught gradually travels southward; and the moisture-laden winds from the Indian Ocean no longer penetrate so far in a northerly direction. Accordingly in October pressure in the Bay is in general lowest in an area lying off the Madras coast; and from this time onwards rain occurs in the Peninsula chiefly in connexion with a series of depressions, or areas of low pressure, which form in the Bay and strike the coast. The rain-bearing winds at such times are north-easterly, and hence the rains of October, November, and December are usually said to belong to the 'north-east

monsoon But the term is misleading, for meteorologically speaking the north-east monsoon winds are the north and north-east winds which blow during the cold weather months across northern India; and these are quite dry. The so-called 'north-east monsoon' rains are in reality due to the retreating south-west monsoon; accordingly, while in October at least five inches of rain may be expected along the coast from Cape Comorin to Bengal, in November this amount extends only as far north as Masulipatam, and in December as far as Madras.

Seasonal forecasting.

The value of an early and reliable warning of a failure of the rains would be extremely great; it would afford indications as to the right time for sowing and the right crop to sow, and it would give greater facilities for arranging famine relief. Accordingly attempts at forecasting the monsoon rains were early made by Blanford, the organizer of the Indian Meteorological Department. While dealing with the weather of the years 1876, 1877, and 1878, the first two of which were characterized by a serious failure of the summer rains, he discovered the unfavourable influence of heavy and untimely snowfall in the mountain zone bordering India on the north on the succeeding monsoon rains, particularly in north-west India; and this discovery was made by him the basis of the first official forecast of the monsoon rainfall in 1882. His successor Eliot saw that local conditions played only a small part in determining the character of the monsoon rainfall, and he therefore sought to employ marine information for the Indian Ocean and observations from Mauritius, Seychelles, and Zanzibar. But the quantity of data available in his time was scanty, and his interpretation of them was, as was inevitable at first, based on intuition rather than on experience.

External conditions affecting monsoon rainfall of India: four main factors.

Since 1903 it has been more fully realized that the variations of weather over distant parts of the earth are by no means independent, and systematic efforts have been made to discover the abnormal features which exercise a favourable or unfavourable influence on the monsoon rainfall of India. The mechanism by which the

influences are exerted is so complicated that it is wiser to base the search on an empirical study of the data rather than on physical reasoning, and the statistical methods due to Galton, Karl Pearson, and others have been largely employed. After a considerable amount of computing of 'correlation coefficients'[1] between meteorological elements over the earth, those elements which have been found to exercise most influence upon the Indian rains are the following:

(*a*) The accumulation of snowfall at the end of May in the mountain zone bordering India on the north and west. When this is large, dry northerly and north-easterly winds are set up and the rains tend to be diminished and delayed, especially in north-west India.

(*b*) Pressure in the Indian Ocean in May as represented by Mauritius. High pressure, although indicating steeper gradients for the monsoon winds, is unfavourable. It appears that high pressure in the Indian Ocean tends to produce high pressure and anticyclonic conditions in India.

(*c*) Pressure in the Argentine Republic and Chile in March, April, and May. It had been shown by Hildebrandsson and Lockyer that high pressure here is usually associated with low pressure in the Indian Ocean, and each of these has been found to be favourable for the Indian monsoon.

(*d*) Rainfall in April and May in the equatorial regions as represented by Zanzibar and German East Africa. As was pointed out in the paragraph on temperature (pp. 68, 69), the ascensional movement near the equator must greatly diminish if the winds from the South Indian Ocean are to flow into India; and if the equatorial

[1] The correlation coefficient between two variable quantities is the proportion of the variations of each which are determined by those of the other. Thus if the factors are independent, the coefficient is zero; if they always move by exactly proportionate amounts, either increasing or decreasing together, the coefficient is $+1$; and if by proportionate amounts in opposite directions, it is -1. If one-half of the variations of one quantity are governed by those of another and the other half by accidental circumstances, the coefficient is $\frac{1}{2}$.

rainfall is heavier than usual it implies that the ascensional movement is abnormally strong, and hence that conditions are unfavourable.

Other factors.

In addition to these factors, of which information is available at the beginning of June, it has been found that the pressure in India in the previous year affords a useful indication of the monsoon rainfall, high pressure being usually followed by abundant rain. No explanation has been given of this relationship, but it has the great advantage of being available six months before the arrival of the monsoon to which it refers.

The handling of the data by statistical methods culminates in a simple formula, which gives the most likely rainfall of India when given the departures from normal of the elements above described.

Inferences are also drawn as to the amount of ascensional movement near the equator and the lateness or earliness of the season from the logs of ships; and information from Egypt regarding the Nile is of value owing to the close relationship between the rainfall of Abyssinia which produces the Nile floods and the monsoon rainfall of western India.

Another factor which has been put forward as likely to influence the monsoon is the presence of icebergs in unusually large numbers in the southern portions of the Indian Ocean. The reports are inevitably not very complete, but suggest that the presence of ice in the South Indian Ocean is favourable to Indian rainfall. The question can scarcely be decided until a longer series of records is available.

Forecasts in June and January.

The forecast whose methods are here given is issued at the beginning of June, and a second, based on similar principles, is issued early in August.

A forecast is also prepared at the beginning of January for the rainfall and snowfall of the ensuing cold weather. This depends chiefly on the fact that in general a season which is mild or severe in January and February shows its character during December in Persia, Baluchistan, the Punjab, Kashmir, and the Himalayas; precipitation has

already begun in these areas from the series of depressions which travel from Europe and in the succeeding months give the rainfall in the plains of India. It has also been found recently that a prejudicial influence on the rainfall of the winter is exerted in December by heavy rainfall in the Bay of Bengal and the south of the Peninsula. The latter probably means that the meteorological equator is farther north than usual, and that the path of the winter depressions is too far north to benefit the plains of northern India.

The influence of solar conditions and of periodicities on Indian rainfall.

Various attempts have been made to derive forecasts from relations with solar conditions or from considerations of numerical periodicity, and some account of these is desirable.

In the earlier years of Indian meteorology, when there were no long series of reliable data available, it was inevitable that the occurrence of a few exceptional seasons near the time of sunspot maxima or minima should lead to the enunciation of a relationship. Thus Hill was led by the severe cold weathers of 1864–5, 1867–8, 1876–7, and 1877–8 to the view that wet winters are associated with minimum sunspots; but the more reliable data of the last thirty years point to the opposite conclusion, for there was a definite tendency to severe cold weathers during the years near 1884, 1893, and 1906, and to mild winters near 1888 and 1900. This affords a good example of the danger of drawing conclusions from data that do not cover many of the periods whose effect is sought, and also of the fact that unless the control exerted by the solar conditions is powerful it is of no use for forecasting the character of a particular season.

Solar conditions.

The most recent attempt at a correlation of solar conditions with those of Indian rainfall has been that of the Lockyers in 1900. They base their method partly on certain changes in the spectrum of sunspots that had been observed at South Kensington, and partly on a comparison of the Indian rainfall records with the numbers of sunspots in successive years. The first of their criteria is no longer of use, for the 'crossings' of widened lines

have not been observed since 1892; and their second criterion depends on the view that 'pulses' of heavy rain in India occur close to the times of sunspot maxima and minima, while during the intervals between the pulses scanty rainfall or drought is to be feared. Taking first the question of the pulses of heavy rain, it may be noted against this theory that of the fourteen years of scanty rain or drought between 1820 and 1878 that are given in the report of the Indian Famine Commissioners, no less than ten (namely those of 1823, 24, 32, 33, 37, 38, 44, 60, 68 and 77) occur either in years of maximum or minimum sunspots or in a year next to one of these. Further, if we consider the years from 1865 to date, in which reliable values exist for the rainfall of India, the most satisfactory test for the method appears to be that of taking a curve that shows the annual sunspot numbers and of picking out the years of extreme sunspot numbers (such as 1866, 67, 70, 71, 76, 77, 78, 79, 82, 83, 84, 88, 89, 90, 92, 93, 94, 1900, 01, 02, 05, 06, 07, 10 and 11) and the years of intermediate numbers (such as 1869, 73, 74, 80, 85, 86, 91, 96, 97, 98, 1903, 04 and 09). The average rainfall of the south-west monsoon in the 25 extreme years is in excess by 0·19″, and of the 13 intermediate years is deficient by 0·35″. These results are in the directions required by the theory, but are decidedly too small to justify it as a method of forecasting.

That the temperature is generally lower, especially in tropical regions, at times of sunspot maximum was proved by Köppen, and this has been explained as due to additional cloud and rain at such times. In India a statistical analysis indicates that the correlation coefficient of the monsoon rainfall, averaged over India, with sunspots is about a fifth; i.e. that of the variations of the rainfall one-fifth varies directly with the number of sunspots and four-fifths are determined by causes independent of this. Such a relationship is too slight to form the basis of a forecast for any particular year.

Periodicities.

Turning to the question of periodicities in rainfall, so much facility would be introduced in seasonal forecasting

if there were a strong tendency for the character of the season to repeat itself after regular intervals that the search for cycles has attracted many minds ; but although numerous periods of this kind have been brought forward for various parts of the earth, scarcely one has survived the test of prolonged experience. The only exception, and that a partial one, is that of Brückner, who showed that on the whole there was a tendency for periods of wetness and dryness, and of warmth and coldness to occur after an interval of something like 35 years. Here the effect of the periodicity is not powerful enough for the character of any particular year to be dominated by it, and it is only when groups of years are considered that the effect of the periodicity can be seen. In the case of India, where reliable rainfall data extend back in general for only 50 years, the length of the record is not great enough to decide with certainty whether a cycle such as Brückner's exists or not. That there is no strongly marked repetition after a constant period of only a few years may easily be verified.

Daily forecasting.

The principles of daily forecasting employed in India do not differ essentially from those employed in other parts of the world, being based on experience, though suggested in a number of cases by theoretical considerations. The most marked differences in actual practice arise from the greater uniformity of the conditions, and the greater extent to which rainfall is controlled by the movements of cyclonic storms.

[The Meteorological Department issues a *Monthly Weather Review* and also an *Annual Summary*. See also Sir J. Eliot, *Handbook of the Cyclonic Storms in the Bay of Bengal* (Calcutta, 1901), *Handbook on the Meteorology of India* (Calcutta, 1906), *Climatological Atlas of India* (Edinburgh, 1906).]

CHAPTER III

VEGETATION, FORESTRY, AND FAUNA

By Sir S. Eardley Wilmot

Vegetation and Forestry

General description of Indian flora.

The vegetation of the Indian Empire has been described as being more varied than that of any country of equal area in the world; while at the same time it possesses fewer genera and species truly peculiar to the locality than most other areas of corresponding size. The richness of the flora, with its 17,000 species of flowering plants under 176 natural orders, is referable, first, to the immense size of the country which, extending as it does over some 27 degrees of latitude, permits great variation in altitude, temperature, and moisture; and, second, to the spread of plant-life from the surrounding countries: from Africa, Europe, and Asia in the west, from Tibet and Siberia in the north, and from China, Japan, and Malaysia in the east. It has been estimated that the Malayan, the European and nearer Oriental, the African and Arabian, and the Chinese and Japanese elements combine to form the Indian flora approximately in the order of importance above given.

The botanical regions.

For the purpose of a botanical survey of India three main regions are primarily prescribed—(i) the Himalayan, (ii) the Western, and (iii) the Eastern; the two latter being divided by a line drawn northwards from Calcutta to the base of the Himalayas; but these areas are too extensive to serve as an ultimate division of plant-life, and it has been found necessary to form provinces in order to permit of its more detailed classification. For though in the Himalayas alpine and temperate types exist which are not to be found elsewhere in the empire, and though the division between the Western and Eastern regions may roughly coincide with the influence of immigration from

Europe, Asia, and Africa on the one side and from Malaysia, China, and Japan on the other, yet other almost equally important factors present themselves to make a further subdivision imperative. Hooker therefore designated seven provinces for British India: the Eastern and Western Himalaya, the Indus Plain, the Gangetic Plain, Malabar, the Deccan, and Burma.

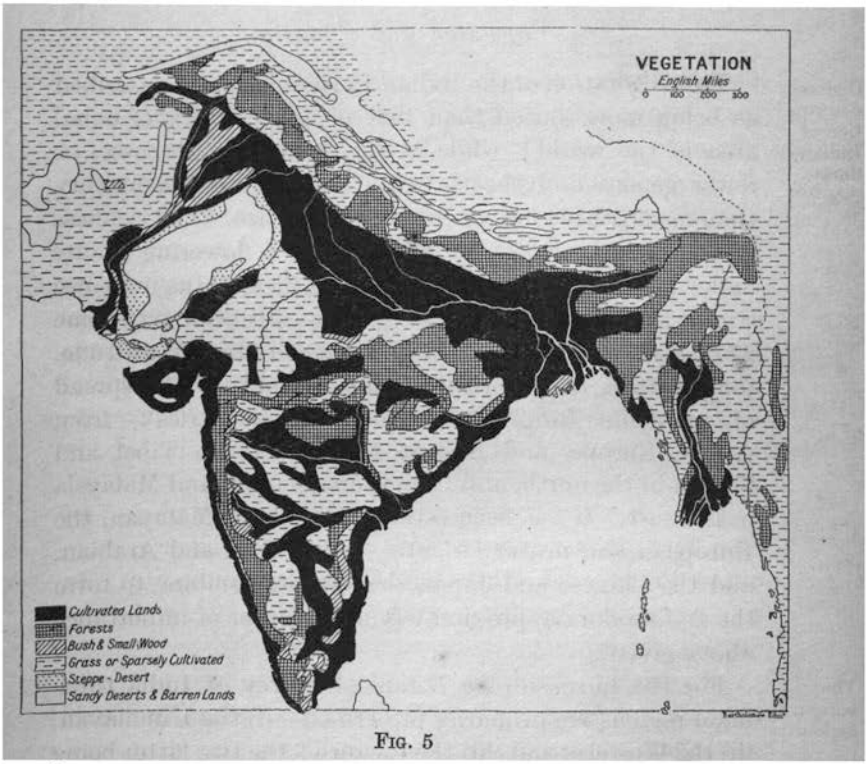

FIG. 5

The Himalayan provinces.

The characteristics of the vegetation of the Himalayan provinces are the richness of the tropical, temperate, and alpine flora; the forests of conifers and oaks and the numerous orchids. But the conditions of the Eastern and Western provinces are widely different. In the former the rainfall rises to over 100 inches, while in the latter it falls below 40 inches; in the Eastern, Malayan genera are dominant and the Orchideae is the largest natural order; while in the Western, European genera

are more numerous, conifers abound, and the Gramineae take the lead in natural orders, the Orchideae being relegated to seventh in the list.

In the Eastern Himalaya the Magnoliaceae are typical; oaks, laurels, maples, alder, silver fir, yew, and spruce are common; while one larch is also found. In the Western Himalaya the larch is absent, but all the other species are represented, with also the deodar cedar, the cypress, *Abies Pindrow*, *Pinus Gerardiana*, and others; as well as two more oaks, of which one, the ilex, extends from Kumaon to Spain.

The Indus Plain province.

The vegetation in the Indus Plain province is of a distinctly desert type, for here the rainfall is everywhere insignificant and ceases altogether to the south in the Indian Desert. The type of plant-life is low and herbaceous, and trees such as the 'sál' and long-leaved pine are on their western limit. Other representatives of tree-life are *Bombax sterculia* and *Mimosa*; *Dendrocalamus strictus* is the only bamboo; but *Populus euphratica* and two species of willow flourish wherever water is present; and, by means of irrigation, good fruit can be readily grown.

The Gangetic Plain forest.

The Gangetic Plain province exhibits great variety of climate and temperature; while the rainfall varies from about 15 inches in the west to 75 inches in the east. In the more arid portions of this province the trees are leafless throughout the dry season and the grasses and shrubs wither; and, though the common vegetation of the drier parts of India still flourishes, it has in places to contend against an alkaline soil which is almost prohibitive to plant-life. Passing eastwards cultivation increases enormously and evergreen species appear, palms, mangoes, fig trees, and bamboos becoming characteristic of the country. Hooker has noted that the trees of this area are mostly introduced, such as *Michelia champaca*, *Bombax malabaricum*, and that the common herbs and shrubs are those found generally elsewhere in India.

In this province are placed the Sundarbans with their heavy rainfall and tidal forests, where flourish some fifty

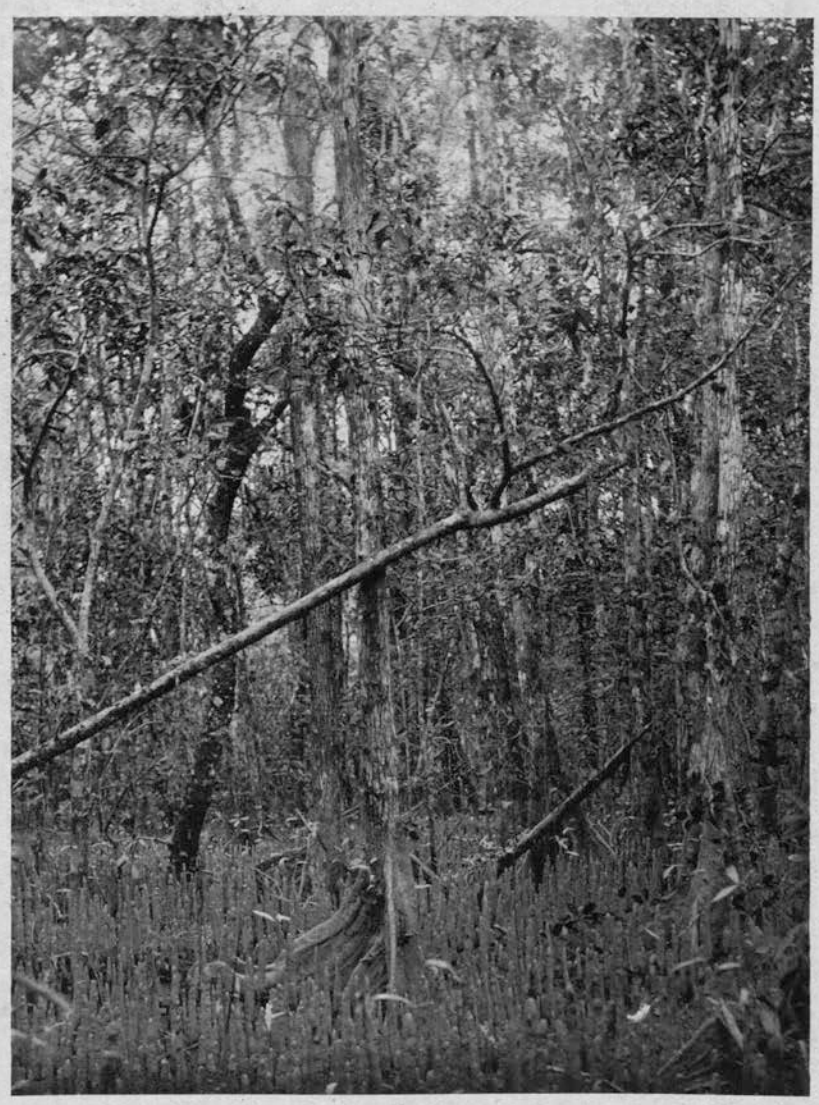

PLATE VII. THE SUNDARBANS

(Sir S. Eardley-Wilmot)

PLATE VIII. GUDULUR, MADRAS

(Sir S. Eardley-Wilmot)

species of trees, some of them being purely estuarial, while others, growing in soil now raised above flood-level, are common to other parts of India. The mangroves, the stemless *Nipa fruticans*, and the tall grass *Oryza coarctata* are characteristic of this interesting area.

The Malabar province is characterized by extreme humidity; the vegetation is of Malayan type, which, however, merges into that of the drier provinces to the north. There are many palms; the genus *Strobilanthes* is notable for the beauty of its flowers, and bamboos are represented by seventeen species; orchids, mostly epiphytic, are also numerous. The Nilgiri Hills present a most interesting flora, rising as they do to a maximum elevation of nearly 9,000 feet, and their 'sholas' or wooded hollows, where the perennial springs have their source, were once filled with magnificent evergreen trees, which are now being gradually killed out by grazing and firing. The Malabar province.

The Deccan province is marked by the presence of deciduous forests on the plateaus and of evergreen forests on the coasts and eastern slopes. The teak, the satin wood, the redwood, toon, and sandal are common trees of this area; while on the black cotton-soil there are to be observed various trees, of which perhaps the *Acacia arabica* is the most typical. The Deccan province.

The flora of the Burma province is not so well known as that of other parts of India. The country varies much in climate by reason of its vast extent; while the intricacy of its mountain ranges and its many geological formations all tend to the production of a very rich flora. Up till now some 6,000 species of flowering plants have been recorded from this province, and among natural orders the Orchideae and the Leguminosae are most strongly represented, as is the case in the Eastern Himalaya. The province, which besides Burma proper includes botanically Assam with its mountains, Cachar, Sylhet, and Chittagong, is one of forests, and it is possible to classify these under many subheads. Kurz enumerates ten for Burma alone, starting from the The Burma province.

evergreen forests of the coast to those of the hills, proceeding through the deciduous forests of the diluvial soils to those of the more arid country, and including bamboo forests and savannah lands amongst others. Hooker divided the Burma province into four sub-provinces: the Northern, where the vegetation is somewhat similar to that of the Eastern Himalaya; the Western and Southern, where evergreen forests with many species of Dipterocarps are typical; the Eastern, comprising the intricate hills between Burma and China of which little is known botanically; the Central, where the flora is more or less of a Deccan type. Besides these the Andamans and the Nicobars present a fair field for further exploration.

Influences affecting distribution of plants.

But whatever may be the method of territorial classification of plants for the convenience of research, such classification is ultimately regulated by those influences which are paramount in the geographical distribution of species; and the principal factors which effect this distribution are latitude, altitude, and moisture, with, to a lesser extent, the nature of the soil. It depends upon the locality which of these influences is most effective. Thus in the Himalayas the two former are perhaps the most important, while in the rest of India the amount of moisture is the outstanding factor in fixing the type of vegetation. On this latter basis a classification of area has been adopted by Prain in his *Plants of Bengal*; while some forty years ago Brandis suggested certain zones of rainfall coincident with political boundaries, which stand to this day as affording to any practical observer, such as a forester, who has access to tables of recorded rainfall, the means of determining roughly what manner of plant-life will most probably be found in any given tract.

These zones are as follows:

(i) The arid zone with a rainfall not exceeding 15 inches—Sind, South Punjab, and West Rajputana.

(ii) The dry zone with rainfall not exceeding 30 inches—the Punjab Plains, East Rajputana, the United Provinces as far as Cawnpore, the Deccan, Mysore, and the country on either side of the middle course of the Irawadi River.

(iii) The moist zone with a rainfall exceeding 75 inches—the Western Ghats, the Eastern Himalaya, Assam, Eastern Bengal, the north of Upper and the whole of Lower Burma.

(iv) The intermediate zone with a rainfall between 30 and 75 inches—the whole of the rest of India.

Distribution of forests.

Following this classification it is an easy matter to apportion on general lines the various types of forest which, covering some 240,000 square miles of territory, are in British India the property of the State, and this is conveniently done in the following manner:

(i) The Evergreen Forests.
(ii) The Deciduous Forests.
(iii) The Dry Forests.
(iv) The Alpine Forests.
(v) The Tidal Forests.
(vi) The Riparian Forests.

Of these the three former are absolutely dependent on the amount of rainfall, and the last two on inundation by salt or fresh water.

Trees of economic value: Western evergreen forests.

The distribution of tree-growth of economic value within the above areas is roughly as follows. In the western evergreen forests the most important timbers are yielded by *Calophyllum tomentosum*, *Artocarpus hirsuta*, *Callenia excelsa*, *Xylia dolabriformis*, *Pterocarpus Marsupium*, *Lagerstroemia lanceolata*, *Terminalia*, and teak, the last here, as elsewhere, occurring in the evergreen belt, a fact which points, as some think, to the spread of this kind of forest. *Mesua ferrea* and *Hydnocarpus Wightiana* are met with on the higher slopes, while in the sholas of the Nilgiri and other hill ranges there are several species of *Eugenia*, *Eleocarpus oblongus*, *Ilex Wightiana*, and others yielding timber. The undergrowth of bamboo and cane is also valuable.

Burma evergreen forests.

In the Burma evergreen forests the crowns of the Dipterocarps spread at from 150 to 200 feet above the forest floor, and other deciduous trees such as *Sterculia*, *Tetrameles*, *Acrocarpus*, *Albizzia*, and *Xylia* shade the evergreen forest below them, in which are found *Mesua*

ferrea, Cedrela Toona, Mangifera indica, Trewia nudiflora, Lagerstroemia of several species, and very many others. Climbing and screw palms with bamboos, some of the latter attaining a height of 100 feet, are common.

Sub-Himalayan evergreen forest.

The sub-Himalayan evergreen forest contains a vast number of species such as *Terminalia, Artocarpus, Cinnamomum, Bombax, Dillenia, Eugenia,* and *Pterospermum,* which individually attain enormous size, differing in this respect from the evergreen forests of the Carnatic which yield hard timber from close-grown trees of *Mimusops, Diospyros, Pterospermum, Eugenia,* and others, mixed with but few deciduous trees.

Deciduous forests.

The deciduous forests extend throughout the Peninsula and reappear in Burma, and are of all forest types of the greatest economic importance, affecting as they do the welfare of the largest proportion of the population. They contain the Sal (*Shorea robusta*), the ironwood (*Xylia dolabriformis*), the teak (*Tectona grandis*), the red Sanders (*Pterocarpus santalinus*), the sandal (*Santalum album*), the sissu (*Dalbergia Sissoo*), the Cutch (*Acacia catechu*), and others of only slightly less value, such as *Terminalia, Lagerstroemia, Dillenia, Eugenia, Diospyros, Bassia, Albizzia, Bombax,* and a host of others, including the wood-oil yielding species of *Dipterocarpus.* Here too flourish the vast forests of bamboo in great variety.

Dry forests.

The dry forests contain little but such trees as are of local value, and these are seldom fully developed; *Bombax Malabaricum* is perhaps the largest tree, and *Prosopis, Sterculia, Anogeissus, Acacia, Phyllanthus, Bauhinia, Butea,* and *Terminalia* are typical.

Alpine forests.

The alpine forests are characterized by the presence of oaks and rhododendron, much used for fuel; by the cedars and pines, which yield valuable timber and resin; and by the firs and spruce, at present not much sought after, but doubtless later on to be converted into pulp. As before pointed out, the variation in the tree vegetation of the Himalaya passing from east to west is most marked. Yet everywhere there are trees yielding timber which, though useful to the local population, is either not avail-

able in sufficient quantity or costs too much in carriage to be transported to the markets of the plains at remunerative rates.

Tidal forests.

The tidal forests in Bengal and Burma contain nearest to the sea the mangroves, which yield fuel and also bark rich in tannin. Farther inland but still washed by the tides the *Heritiera* appear, providing the sundri wood invaluable for boat-building in a country where the highways are formed by creeks and channels in the river deltas, and here also *Nipa fruticans* grows densely.

Riparian forests.

The riparian forests are represented in the one extreme by the swamp forests of Burma, where a fairly high tree-growth is found, comprising such species as *Anogeissus*, *Mangifera*, and *Xanthophyllum*, while below these grow *Eugenia* and *Eleocarpus*, with yet smaller trees of *Cassia fistula* and others of less economic importance. Here the soil is damp or muddy all the year round; but, at least during the monsoon months, it is free of salt. At the other extreme may be placed the river forests of the almost rainless tracts of the west of India, where the annual rise of the rivers causes temporary inundations in the summer. Here *Acacia arabica* flourishes, and *Tamarix gallica* lines the watercourses together with *Populus euphratica* and, more rarely, *Dalbergia Sissoo*. High grasses such as *Saccharum sara* and *Munja* are frequent, and have considerable value locally. Between these two extremes of riparian forests, the one always damp and the other always dry save for a few weeks of the year, various other types of growth will be found, all of which are of economic importance in the life of the adjacent population.

General economic importance of the forests.

In order to realize the importance of the Indian forests two points must be borne in mind: first, that they cover, including forest areas in native states, nearly one-fourth of the soil of the empire; and, second, that they are managed for the benefit of the people. Incidentally it is true that they contain timbers valuable in the West, such as the teak for which hitherto no substitute has been found in the construction of the decks and other parts

of the steel vessels of to-day, and such as the rose-wood, ebony, and sandal which have special beauties or uses; but the available volume of such timbers remains insignificant when compared with the produce yielded by the immense area covered with forest growth, which is consumed locally either by the inhabitants or by the great public works, such as railways, canals, &c., which must necessarily increase in importance as the development of the country proceeds. Some idea of this outturn can be gathered from the fact that in the five years 1904–9 a yearly average of 14,000,000 cattle were grazed in the State forests, nearly 238,000,000 cubic feet of timber and fuel with 196,000,000 bamboos were annually extracted, while minor produce to the value of £326,000 was collected each year. The people in fact, to a greater or less extent, are dependent on the products of the forest for their domestic and agricultural requirements. The roofs of their houses are made of grass, palm-leaves, or shingles, and are supported by bamboos or wooden poles. Their ploughs and carts and other implements are of wood, their ropes of grass or fibre. Their oil- and rice-mills are of wood, and they use besides a thousand products of the jungle in barks, roots, fruit, and leaves in the daily routine of life. They fence their fields with thorns from the forest and manure them with green foliage or with wood-ashes. And, as neither buildings nor implements are of a permanent nature, there is a never-ending demand for these products, which in years of prosperity is accentuated by the desire for better and more lasting material. The staple industry of the Indian Empire is agriculture, and so intimately is this connected with forestry that the revenue from the latter rises and falls with the fluctuations of prosperity and depression which so frequently follow each other in a country whose wealth is in the field-crops, while these unfortunately remain, save in irrigated lands, entirely at the mercy of a rainfall which, to be beneficent, must not only be sufficient but seasonable.

Regulation of

The economic value of the Indian forests, however, is

not confined to the direct supply of cheap produce to the population. They have perhaps a greater influence on the welfare of the country in regulating the water-supply in a land where, roughly speaking, there are six months of rain and six months of dry weather. The rivers flow from the hills and the springs emerge at their feet. Nature has covered the mountains with trees, herbage, and grass in order to intercept the copious rainfall, so that it shall sink into the soil and not run off the surface of the earth in destructive torrents; so that the rivers and springs shall be perennial and the water-table in the plains maintained at a constant level. She proposes that the moisture necessary to the life of man and beast shall not be allowed to run to waste, but shall be available throughout the year for their benefit. The failure of a permanent supply of surface water, the sinking of the level of the subterranean moisture, may result in misery to thousands through crop failure for want of irrigation. Such a shrinkage of the underground water-supply as recently occurred, for instance, during a cycle of dry years in Upper India, was responsible for the death of deep-rooted forest trees over hundreds of square miles, and increased enormously the labour of irrigation from wells, which is carried out by extremely primitive means in this, as in many other parts of India. water-supply.

Other consequences of the removal of the forest growth from the hill-sides are frequently seen in the erosion of the surface soil, which is washed down into the valleys, followed by gravel and boulders, to the destruction of the fertile fields of the plains; in the slow but inevitable movement of rivers of sand which spread fan-like over the village lands; and in the disappearance of springs of living water which were at one time perhaps the inducement for the establishment of prosperous settlements. Erosion, &c., on dis-forested lands.

The forests of the Indian Empire, therefore, have an indirect as well as a direct economic value, neither of which exists in Britain with its humid climate and assured rainfall, with its enormous importation of forest products from abroad; but which elsewhere, even so

near home as on the continent of Europe, assume an importance which justifies the interference of governments in their upkeep and management.

Influence of forests on human welfare.

It is difficult to produce even with the aid of a vivid imagination any valid comparison between the influence the forest exerts upon the daily life of the people in India and of those in the British Isles. To form an idea of the magnitude of these influences in the East we should have to begin by premising that one-fifth of the area of the United Kingdom was under forest growth and was owned by the State; that the remaining four-fifths was given over to the cultivation of field-crops, with but few industrial centres and these of comparative insignificance; that the welfare, even the lives of the inhabitants, were dependent on their harvests because there was no importation of food-grains, and that any irregularity in the seasons might prevent the seed from germinating or the fruits of the earth from ripening. If existence could be imagined under such unstable conditions in England, if at the same time it was recognized that the forests yielded fodder for the cattle upon whom the agricultural operations of the country entirely depended, if also there were therein fruits, seeds, roots, leaves, and herbs of a hundred kinds which could support human life in extremity, then only, setting aside the importance of the forest as an aid to agricultural prosperity, its value in times of stress would be fully appreciated. And at the same time the responsibilities of the Government in perfecting the lines of communication in order to allow of the rapid movement of food-stuffs, and in the expenditure of large sums on irrigation as a means of assuring regular harvests, would be clearly understood.

Forest administration.

It will be of interest briefly to set forth how this immense area of forest-land is administered so that the country at large may profit thereby. In the first place adequate protection must be provided against man, for in India as in other countries the property of the community must be guarded against the individual; and in the East this is all the more imperative as regards

the forests because from the beginning primaeval man has waged war against them, fighting for his own existence against a vegetation that threatened to overwhelm him; so that now, even after he is firmly established in his cultivated fields, inherited instincts prompt him to injure with fire and axe and with wasteful utilization the remnants of the forest growth standing at his door. He fails to comprehend that the time has arrived rather to create than to destroy, and that, unless the natural resources of his country are safeguarded, the prosperity he himself enjoys will not be the portion of his descendants.

Forest laws.

Hence follows the enactment of special forest laws which lay down certain rules and the punishments attached to their non-observance; which regulate, for instance, the firing of the grass-lands, the felling of timber, the removal of produce, the grazing of cattle, and all other acts which might, by their abuse, not only prevent the improvement of the forest growth, but when continued possibly lead to its complete destruction. For forests in the East are not planted by the hand of man; they extend over too vast an area to be dependent for their renewal on nurseries and plantations; the more so as, if permitted to grow, they flourish by means of natural reproduction, and yield their harvest continuously for the use of man provided that intelligent care and assistance is given to their requirements.

Protection of forests.

Under the authority of legislation the work of protection becomes possible, and the first step in this direction is naturally demarcation and survey, so that the owners may become acquainted with the details of their property and the people may know where limits are set to their free action. Following on survey it becomes possible to tabulate the rights and privileges of the population surrounding the forest areas. In some cases these rights are so numerous as to claim the whole of the yearly crop, in others they may be of minor importance. But in any case the quantity of timber, the number of bamboos, the loads of grass and other produce, together with the number of cattle with rights of common, have to be defined

for each village; not only so that the people may continue to enjoy the user to which they have for so long been accustomed, but also that the forester may be placed in a position to cultivate that form of timber or other produce which is in request. Only when this local demand is satisfied is he at liberty to offer for sale the remaining crop on the area within his charge. The value of produce thus granted free or at special rates to villagers amounts to about £300,000 yearly.

Settlement being complete, it becomes incumbent on the forester to prepare a plan of working for his forest. He has to provide for the largest perpetual yield that the soil will afford, and to this end he must carefully prescribe the treatment to be followed for many years in advance, and that not only in reference to the tending of the crop, to thinnings, cleanings, fellings, and such operations, but also in regard to the removal of the produce. His scheme of communications and buildings must be systematically carried out in advance of requirements, and at the same time he must be prepared to administer the forest law and create a staff competent to cope, not only with intentional wrongdoing, but also with those disasters which are referable to accidents, of which perhaps the firing of the forest is the most important. Taking into consideration that yearly some 70,000 offences are committed against the forest law in India, and that between 4,000 and 5,000 fires occur annually in the forests, it will be evident that the staff can have no easy task in carrying out their protective as distinct from their professional duties in silviculture.

Forest management.

It has been said that the Indian forests are, and must continue to be, dependent for their continuance on their own reproductive energy; and this implies that, except in limited areas where it is possible and remunerative to proceed to detailed working, the sole assistance that the forester can give to nature is by means of the axe. It is in the removal of inferior species, in the thinning of the valuable species, in the timely felling of mature trees, that he can hurry on the leisurely sequence of events in

the virgin forest. The forester in the tropics seldom resorts to clear felling, for if this is done the soil is speedily covered with a dense growth of grass or herbs through which useful seedlings fail to penetrate. Whether the selection or other system be adopted in high forest, the aim must always be not to allow so much light to reach the forest floor as will lead to the deterioration of the soil from climatic influences, or to a choking by weeds of useful forms of vegetation. It will be seen, therefore, that, speaking broadly, the largest areas of forests in India are always in a state of regeneration, and that being the case it becomes imperative that cattle which eat and trample the delicate seedlings, and fires which destroy them, must be as far as possible excluded if a successful result is to be arrived at.

The subject, however, is not so simple as may at first sight appear. Cattle must be fed, and in practice the aim is not so much to prohibit as to limit their intrusion; while as to fires it is not a maxim of universal application that their prevention is beneficial. For instance, fire-conservancy in some parts of the country results in the rapid victory of the comparatively worthless evergreen forests over the more valuable deciduous type. In others again the forest floor, when unburnt, yields so dense a crop of low-growing herbs that the germination of the seeds of the light-loving species becomes impossible. In these and many other similar instances the forester will have to choose between preventing the entry of fire altogether or its admission under strict control as to season and locality; it is in such cases that his experience and knowledge become of value. In any event the work, whether of prevention or control, will be of the most arduous; for it must commence at a trying season and extend over many months until the monsoon rains begin; while during this period there is not a moment of the day or night when purposely or accidentally a fire may not be kindled, to burn fiercely over many square miles, often fanned by a gale of hot wind, endangering human habitations and human life and perhaps wiping out in

a few hours the result of years of strenuous attempt towards the improvement of the public property. About 46,000 square miles of forest are specially protected against fire in India at a cost of many thousands of pounds annually, a sum which may be considered as an insurance premium on the growing stock; for the least damage that a fire in a deciduous or coniferous forest can possibly cause is to set back for one year the growth of seedling or sapling, so that, so far as these are concerned, there must result the loss of a considerable dividend.

Transport of produce.

It is of course a matter of common knowledge that the cheap transport of forest produce, though often difficult by reason of its bulk, is of paramount importance. The most valuable forests in India at the present time are those which, owing to their inaccessibility in the past, have escaped the attention of the timber trader. It follows, then, that the Indian forest officer has had his attention inevitably directed to the necessity of not permitting transport charges to equal or, as in some cases is possible, to exceed the market value of his produce. The extension of railways, particularly of light feeder-lines, has had a remarkable effect on the value of the forest property of the State by rendering possible the cheap distribution of the forest yield; for it may be imagined that, as agriculture is of paramount importance, the forests stand for the most part on poor soil and in out-of-the-way localities. Carriage by rail on account of its comparative rapidity is now, where available, taking the place of slow water-carriage which in bygone years was almost the sole profitable means of transport, for the Indian trader works on borrowed capital, and a quick turnover is essential to his success.

The forest officer has still to provide the means of bringing his produce to the railhead, and has constantly before his eyes the arrangements necessary in this regard. In the mountains he constructs slides, sledge-ways, and wire-tramways; in the plains he has to consider the desirability of making wheel-tramways and, above all, suitable and well-bridged roads on which

carts drawn by bullocks or buffaloes can work at remunerative rates. He has to clear the minor streams of obstructions so that his sleepers may pass to the main rivers; and, in the Far East, he is dependent on elephant haulage to convey his heavy teak timber to the deep waterways where the large rafts are made up.

It would, however, be impossible in the space of a short article to enumerate the work for which a forester is responsible in the East. It is best that he be presented as the agent for a vast estate which may extend over 100 to 2,000 square miles, and that within this area he has to perform, not only all those professional tasks that are necessary to make his work a commercial success, but also to secure and to keep the goodwill of the neighbouring inhabitants, on whom he is dependent both for labour and for assistance in times of emergency.

The Forest Staff.

It may be asked what manner of men are those who devote their lives to forest management in India, and what are the conditions under which this work is carried out. The Indian Forest Service comprises the following staff: an inspector-general, who is adviser to the Government of India, and visits all parts of the empire in order to fit him for his responsible task; conservators, who are the administrative officers under provincial governments; and executive officers, who are in charge of districts. These members of the service number about 200, and are all appointed by the Secretary of State for India after prolonged training at universities at home and field-work in the continental forests. Another 200 officers are recruited in India from past students of the local forest schools, and these 400 officers control the work of about 15,000 Indian subordinates, whose ranks, however, are strongly reinforced during the dry season when special protective measures have to be taken.

Conditions of forest service: climate.

The conditions under which this brigade of workers live must of course be as various as the parts of India in which they are stationed. The subordinates are recruited from and remain in their own districts, but all executive officers are recruited for service in the empire, though as

a rule the Indian officer remains in the province of his origin for the reason that he possesses a knowledge of the local vernacular and is not compelled, as is the European, to become proficient in another should transfer render this desirable. In the Himalaya, surrounded by forests of oak, cedar, pine, and fir, with head-quarters situated some 6,000 feet above sea-level, there is little reason to complain of the Indian climate; the summers are warmer and the winters colder than in England, but the seasons are more regular and the air drier. The Englishman here may miss some of the comforts of home life, but he gains considerably in other ways. Descending to the deciduous forests great extremes of temperature are experienced. In the winter nights heavy frosts are frequent, while in the summer the thermometer may register over 100° F. during many days and nights, a hot wind blowing over the land, withering the vegetation and causing a constant dread of fires. Here work in the felling areas, where hundreds of men are employed in logging and sawing, ceases with the arrival of the dry season at the end of March, and may not be resumed till the following November. The monsoon rains set in in June and last till the end of September, and during this period none but the jungle folk remain in the forest. In the evergreen zone the climate is more equable, being continually hot and damp, and the seasons are less marked, so that forest work is more continuous; while in the tidal forests of the Sundarbans the forester is practically all the year round residing in houseboats and going to his work in dinghies.

Housing, &c.

At this time in many forests suitable provision has been made for the housing of the staff, it having been realized that by this means alone, and by the provision of pure water, the heavy mortality from malaria and dysentery could be reduced. The yearly cost of roads and bridges constructed and maintained by the Forest Department amounts to about £95,000. But to inspect the work continually proceeding over these vast executive charges tents are still necessary; and complete outfits, rendering

the traveller independent of any outside assistance, are carried by coolies in the hills, on carts or camels in the plains, and on elephants in Burma and elsewhere. In these tents the forest officer resides for many months of the year, returning to head-quarters from time to time with a renewed zest even for the amenities of Indian social life. When in camp, however, the forester is well advised to find some interest outside his purely professional work, and in the subsequent paragraphs on the Indian fauna it will be seen that, whether as sportsman or as naturalist, there is a wide field open to his enjoyment.

Forest finance

Forest finance consists, in few words, of building up the capital invested in the land and in the crops thereon, and in obtaining therefrom the highest possible annual return. The gross annual revenue of the forests of India now amounts to about £1,750,000, and of this more than one-half is spent in forest management, a sum of about £160,000 being disbursed on roads and buildings, cultural operations, surveys, demarcation, none of these works being immediately productive of revenue but nevertheless materially increasing the value of the forest capital. The value of this capital after half a century of conservative working is unknown at present, but it must be enormous, and some estimate of it may be formed later on when the immature crop now on the ground shall have become ripe for the harvest. This future crop has been raised with infinite labour to replace the stock, ruined by ill treatment, which was handed over to the forester when regulated administration was first introduced, and since that time the yearly income has been obtained principally by utilizing the material afforded by cleanings and thinnings, and by the removal of the surplus stock of large trees; but the future harvest will more nearly represent the true annual yield of the forest in sound and well-grown timber. The outturn of the forests of India may thus be expected to rise with the increase of population and prosperity, and there seems to be no reason why the revenue of to-day, which has quadrupled in thirty-five years, should not continue to expand even

more rapidly in the future, especially when more systematic collection of gums, resins, fibres, grasses, dyes, &c., becomes possible; for, as is later on suggested in the case of lac, there is room for great expansion in the trade in these articles.

Fauna

Geographical distribution.

Owing to the great differences in the climatic conditions affecting the Indian Empire its fauna is extremely rich and varied: the kinds of animals found therein being, for example, more numerous than those in the continent of Europe, though the area of the latter far exceeds that of India. Here again, as with the flora, the geographical distribution of the Indian fauna is regulated chiefly by latitude, altitude, and moisture. In the extreme west, in the Punjab, Sind, and western Rajputana the fauna resembles that found in south-western Asia and northern Africa; the higher Himalaya and upper Indus valley contain animal life allied to that of Central Asia. Therefore, as both these regions have much in common with the rest of Asia and all Europe they are formed into provinces under the designation of the Punjab province and the Tibet province respectively; while the rest of India is divided into other three regions, namely, the Indian Peninsula to the Bay of Bengal, including Ceylon; the Himalaya as high as the limit of tree-growth, together with Assam and Burma to the north of Mergui; and, lastly, southern Tenasserim, which forms part of the Malay Peninsula.

Mammals.

Within the above areas W. T. Blandford[1] described in his *Fauna of British India* 1,229 genera and 4,100 species of vertebrates, and about one-tenth of these genera and species are mammals. Amongst these monkeys are numerous, comprising two species of gibbon, whose melancholy notes, often uttered in chorus, will always bring to the memory wanderings in the pathless forests of Assam and Burma when the lofty tree-tops were hidden in the morning mists so that the resounding choir was

Monkeys.

[1] See also his 'Distribution of Vertebrate Animals in India, Ceylon, and Burma', in *Phil. Trans.*, 1901, pp. 335 seqq.

invisible. There are also eight or more species of the common monkey (*Macacus*) distributed throughout the empire, long- or short-tailed, all small and with active habits; and finally the Langurs, of which there are some twelve species, of larger size and of more terrestrial habits than either gibbon or monkeys; and, probably on account of the fact that Hindus regard them as sacred, perhaps more familiar and confiding than these. Langurs are grey in colour in the north of India, but the species common to the south are much darker in hue, that in the Nilgiris being quite black. Monkeys are useful allies to the sportsman in informing him by peculiar warning cries of the presence of the dangerous carnivora; they are also at times most aggravating by giving notice of the approach of man, for deer frequently follow flocks of monkeys in order to feed on the foliage and fruit which they wastefully throw from the trees. On such occasions this warning cry is not given, but the bustle and excitement of the monkeys is communicated to the deer, who rapidly disappear. It is an interesting sight to watch a troop of startled langurs as they bound through the tree-tops on a steep hill-side. They seldom make a mistake, and, if the strength of a branch is miscalculated, the animal will save himself long before the ground is reached. Panthers kill a considerable number of the common monkey; these become paralysed with fear should the enemy appear above them in the branches, and it is then easy for him to leap upon a selected victim.

Cats.

The cat tribe is well represented in the Indian Empire by seventeen species. The ounce and the lynx are found in the Himalaya, and, though seldom shot by the sportsman, he is often only too well aware of their presence by the disturbance caused to the ibex and bharal he is pursuing. The lion is now found only in the preserves of a native prince in the dry portions of the north-west, though some forty years ago old 'shikaris' would suggest that some particularly ferocious and heavy tiger was the result of a cross with a lion—a suggestion which recalled the fact that lions were shot in the neighbourhood of

Allahabad not many years before, and also proved the universal reputation which the lion enjoys, though probably he is less formidable in every way than the tiger. This latter animal, which is present throughout the empire and has been noticed in the Himalaya up to 9,000 feet of altitude, is being driven back by the spread of population aided by the fact that a reward is given for slaying him, and also because organized shooting parties in the present day are arranged easily on account of the improved communication by rail and motor car. In result the tiger later on probably will share the fate of the lion, and will be found only in the preserves of native princes, kept by them to afford sport to important guests.

The panther, on the other hand, though even more ubiquitous than the tiger, appears to be in no danger of extinction. His familiarity with mankind has taught him cunning, and he will continue to take toll of the villagers' herds, and to find safety in concealment, at which he is an adept, in moments of danger. It is the custom to assert that panthers are vermin and give no sport. But when it comes to the hunting of an experienced animal without the aid of hundreds of beaters, it will be found that considerable skill is required to bring this cat within shot, and that, when wounded, he is as ferocious as and much more agile than a tiger. Just as white or black tigers have been recorded, so black panthers are not extremely rare, especially in the south of India. The clouded leopard occurs in the eastern Himalaya, and is perhaps the most beautiful of all the cat tribe.

Other cats of smaller size but of marked coloration are numerous; amongst these may be mentioned the fishing-cat, which frequents water; the marbled, golden, and leopard cats, which are arboreal in their habits; and the rusty-spotted or common wild-cat, which prefers grass-lands and open plains. These latter vary much in colour, and black specimens are not of great rarity. For their size and weight they are remarkably strong and fierce. One has been seen to capture a grazing peacock, a bird

which a strong man finds it difficult to control; and on occasion they will defend themselves from the hunter with extreme courage and ferocity. The hunting leopard is a rare animal which is chiefly seen in captivity; its extraordinary sprinting powers enabling it to catch the swiftest antelope if the ground is favourable.

Civets. Civets are common in India, four species of the true civets being spread throughout the country; they are as much at ease in trees as on the ground, and, being restless and energetic, do much damage to small animals and birds, though vegetable food is not despised in time of need. Other allied species are the spotted and the palm civets, which are nocturnal in their habits; and, lastly, there is the curious bear-cat of Burma which, having a long tail like the palm civets, is the only animal of the Old World in which this member is prehensile.

There are several species of mongoose, an agile and bloodthirsty race; though not immune from the effects of poison, it rejoices in a free fight with the most deadly snake, a trait which doubtless maintains the courage and vivacity of its tribe.

Hyaena. There is but one hyaena, and that is restricted to the Indian Peninsula. The striped hyaena is a nocturnal beast, which lives on offal and takes refuge in underground burrows.

Dogs. Of dogs there are two wolves, the same number of wild dogs, one jackal, and five foxes. The Indian wolf is not found east of the Bay of Bengal. He is by reputation a dangerous animal, and is not averse from residence in the vicinity of man provided that he can find shelter in a country of ravines and thorns, for he objects to the denser forest and prefers a more open country where his sagacity can have fuller play. In the more densely populated parts of the country his presence is, however, no longer tolerated. A second species of wolf is found in the extreme north-west, and a variety of the same extends to Tibet. The wild dog, on the other hand, is an inhabitant of the jungle, though he extends his raids to the open country in its vicinity. He is, on account of

his persistence, the most inveterate destroyer of game, seldom leaving a beat till he has exhausted its resources. It is thus that he drives away the tiger, who has no chance of finding a meal when the deer are so constantly harried; while the panther has little hope of escape from the pack unless he remains above their reach in some convenient tree. The wild dog is always shot on sight by the sportsman, but not many are thus bagged. At times they are most suspicious and wary, at others they will boldly follow the pedestrian or equestrian, and, though there is yet no record of damage done to human life or to domestic cattle, there seems to be no valid reason why, in the absence of wild game, they should not become even more obnoxious than at present. The two kinds of wild dog are found throughout the Indian Empire from Tibet in the north to the far east of Burma.

Foxes. The Indian foxes, of which there are five species, range between the European race found in Kashmir and a much smaller species from Baluchistan. The common grey Indian fox affords excellent sport with greyhounds; he doubles in a marvellous manner, and it frequently appears to the rider as if the flick of his long tail across the forefeet of his pursuer actually caused the dog to throw a somersault at the turn. They are nocturnal, but inhabit the open country, lying up in grass-lands or crops in the day-time. The jackal, which is common throughout the Peninsula, though becoming rarer in the East, is not much good for coursing, though he affords some sport when followed by hounds. The animal has great tenacity of purpose, and shams death with fortitude in the most trying circumstances. The peculiar cry uttered by jackals when in the presence of danger is the most weird of sounds, and the sportsman who stalks the cry will often be rewarded by the sight of one of the dangerous carnivora; though it has on occasion been observed to be caused by the sight of a python or even by a mad jackal, so that some caution is necessary.

Martens, weasels, &c. Martens, weasels, polecats, and badgers are poorly represented in India, though the first three are met with

both on the Himalayas and as far east as Burma. Badgers also are not frequent, though five species have been noted. They are seldom seen, being chiefly nocturnal; and the common Indian badger is reputed to be addicted to the uncleanly habit of grave-digging. Three kinds of otter are found and do much harm to the fishing in the streams of Upper India, where they hunt in packs, driving the fish into the shallows and killing many more than they require. Otters have been hunted with dogs in India, but the results are disappointing, the water being as a rule too heavy to give the dogs a chance.

Bears. Bears are represented in India by four species: a variety of the European bear and the black bear in the hills, and Malayan and sloth bears in the plains. The first alone provides the sportsman with any pleasure either in the chase or in the trophy. The animal was extremely common in former days in Kashmir above the forest line, but at the present time a good specimen can be obtained only with much care and trouble, which, however, is amply repaid, even if the hunter is unsuccessful, by the joys of the open-air life amongst glorious scenery and climate. The black bears, especially the sloth bear, are morose creatures, generally more feared by the natives than tiger or panther; probably for the reason that, though their sense of smell is phenomenal, yet eyesight and hearing are somewhat dull, so that frequently man and beast meet without warning. There is hardly a village in the Himalayas where men and women cannot be found whose heads and faces have been horribly disfigured by the attacks of black bears. In the plains the sloth bear avoids the tiger, yet has been seen to defend himself with great energy, and ultimately to escape, from the attentions of two of these cats. For the panther he assumes indifference by ignoring his presence.

Shrews, moles, &c. Shrews, hedgehogs, moles are represented, the first strongly and the others but feebly. The resident in India makes his first acquaintance with the former in the form of the musk-rat, which runs round his room by night, devouring cockroaches and other unsavoury insects.

As might be expected in a country where insect life is exuberant, bats are common, some ninety-five species being recorded, of which, however, eleven are fruit-eaters. The largest of these is of Malayan origin, and extends to about 5 feet across the wings. The Indian flying-foxes are smaller. These animals hang in clusters head downwards, many hundreds upon one tree during the day, and at dusk, after maybe long flights, descend upon the fruit gardens and rapidly destroy the harvest. It was at one time the custom in Lucknow to have battues of these destructive brutes as they left their perches in the evening; and in Rangoon attempts are made to keep them from the gardens by means of wires stretched tightly between the trees, but neither method appears to be very effective.

Rodentia. Coming to the Rodentia, squirrels, rats, mice, marmots, and porcupines are of course common, and of the first three so-called 'flying' species are recorded; others are beautifully marked, and the palm- or striped-squirrel is an inhabitant of gardens and of bungalows, and makes a most attractive pet with the gentlest of manners, but withal maintaining a dignified independence. As for rats, they have during the past decade come into prominence as harbourers of the plague-infected flea, and though destroyed in thousands seem as plentiful as ever. The marmots of the higher Himalayas and of Tibet occur as three distinct species, and will be watched with interest by the wanderer at high elevations. Hares are represented by eight species extending over the whole of the Peninsula and across the Himalayas into Tibet. The common Indian hare affords but little sport; he is not quick enough to give greyhounds a run, nor can he double with the lightning celerity of the fox. The hispid hare is a curious beast found at the foot of the eastern Himalaya. The nearly allied family of mouse-hares are very small creatures living at high elevations amongst stones and rocks; their habits can be studied by the naturalist with much satisfaction if he remains motionless on some sunny slope, when they rapidly gain confidence and will gambol around him.

Ungulata.

The Ungulata comprise all the most valuable domestic animals and many of the most interesting wild ones. The wild horse or ass is found in the extreme west of India in the deserts of Cutch and Bikanir; it recurs on the Tibet plain, but has no use or beauty. The elephant, the rhinoceros, and the tapir still occur in the great forests of India, though as none of them tolerate the proximity of man their disappearance is merely a matter of time. Already the elephant has almost ceased to have much economic importance in the Peninsula, where he is now chiefly useful for pageants or sport; and though farther east he is still indispensable in the teak forests of Burma and Siam, there also machinery gradually will supersede his use as the country becomes more settled. The shooting of elephants in India affords little sport save in the case of proscribed rogues; and as the weight of the tusks, carried solely by the male and not always present in that sex, is seldom great, there is little profit to urge the hunter to exertion. There are two one-horned and one two-horned rhinoceros in India; the great Indian rhinoceros being found still in Assam and Nepal, the others farther east. Beyond being in a position to boast of having slain one of these beasts the sportsman will derive more satisfaction from observing its demeanour and habits than by killing it. The female, when with calf at foot, is a dangerous animal, charging furiously with the intent and also the ability to destroy any living creature with which it comes in contact. Otherwise this species appears to be of a retiring disposition.

Elephant and rhinoceros.

Wild cattle.

There are five grand specimens of wild cattle to be found in India, the yak, the buffalo, the gaur, the gayal, and the tsine, and these will afford to the sportsman all the joys peculiar to hunting a formidable animal on foot. The gaur has been recorded up to eighteen hands high at the withers, and the vast, dark-chocolate coloured bulk of the bull standing on comparatively slender legs, white below the knee, together with the massive pale-green horns and the light-blue eyes form a picture not easily forgotten. The great size of the buffalo, with its wide

spread black horns and its fierceness and courage, are also admirable. Both these animals are harmless when undisturbed, but frequently exhibit a cunning and tenacity of purpose when wounded which may be highly disconcerting to the hunter. The yak and the buffalo are domesticated, and are therefore of wide economic importance, the former being a well-known beast of burden in Tibet and the buffalo a common domestic animal all over India. In Burma the tame buffaloes are hardly distinguishable from the wild, having often as great a length of horn and as peremptory a temper.

Sheep. The wild sheep of India are represented by four or five species, of which the great Tibet sheep and the great Pamir sheep carry enormous horns and stand from 3 to 4 feet in height. The smaller bharal and urial are found generally above the tree-limit and afford most excellent sport to the energetic stalker. Though they graze on the upland meadows the Indian sheep are quite at home in precipitous ground, and pass with confidence and celerity where no man could hope to follow. A native of the plains of India once remarked to the writer, as they two stood watching a herd of bharal passing through perpendicular cliffs to the meadows below: 'These are monkeys, not sheep', for they appeared to be descending an invisible staircase in drops of 20 feet and more, and, at a distance, no foothold could be observed for so heavy an animal.

Goats. But the goats excel even the sheep in their ease of movement on rocks and cliffs. The latter seem to be indifferent to the difficulties of their surroundings, while the goats appear to seek out these difficulties and enjoy them. The male tahr is usually to be observed on some narrow ledge contemplating the shadowed depths below; and, should he be followed when wounded, he will probably involve the ardent sportsman in difficulties from which he will have trouble in extricating himself in cold blood. Even the magnificent ibex, with horns of 50 inches to over 60 inches in length, frequents less inaccessible ground, while the stately markhor with superb spiral horns is

found frequently within the tree-line on gentler slopes. Allied to these are the goat-antelopes, represented by the serow and the gural, which live at lower elevations; the former being emphatically a forest animal, whose peculiar habit of standing motionless until the unobservant sportsman is at hand and then dashing away through the underwood with a whistle of alarm is most startling. The gural or Himalayan chamois is found on steep ground at elevations of a few thousand feet, and offers to the hunter much good practice in hill-stalking.

Antelopes.

There are but three antelopes in India proper, though a fourth, the Tibetan antelope, is frequent across the border. The Indian examples are not very interesting animals; the nilgai or blue-bull frequents the open country, and does much damage to the crops. At times he becomes dangerous to human life, and is generally regarded as vermin; his small horns, supported as they are by a body large out of all proportion, provide no trophy. The black-buck is also an animal of the open plains, where once it roamed in large flocks now greatly diminished; while the four-horned antelope is a beast of the forest, frequenting grassy plains amongst the tree-growth. There is only one gazelle in the Peninsula, the chinkara, found in the Deccan in broken dry ravines; the females of this species are horned.

Deer.

The deer of India are specially interesting; the small barking deer, with ribbed face and long canine teeth, occurs throughout the Peninsula and in Burma and Ceylon. It is an essentially forest deer, and its sharp, loud bark directs the hunter's attention to its presence long before he has seen it. This barking is particularly insistent when the deer has seen or scented one of the large carnivora, and in the former case it will rouse the jungle with its cries, ultimately flying, still barking, if the danger becomes pressing. Of the genus *Cervus* there are six species, the Kashmir stag alone having, like the red deer of Europe, both brow and bay antlers. The pursuit of this stag affords the best of sport in the best of scenery and climate; but good heads are now seldom

procured save by the favour of officials. Large preserves are now carefully watched, and in these the deer, congregating, are driven up to the guns of exalted guests, to whom such sport can hardly afford much satisfaction.

The swamp deer extends from the base of the Himalayas as far south as the Godaveri, and is perhaps at his best in the Central Provinces. He carries a head of twelve points, and occasionally an old stag will be found with as many as twenty. He is an animal of the marshes in Upper India, where many are shot from the howdah; though farther south he may be observed in the grassy hollows between wooded hills. The brow-antlered deer of Burma replaces the swamp deer in the east, but is not of such imposing appearance. The sambhar occurs throughout the Peninsula and in Burma wherever there is well-wooded hilly ground. He ascends in the Himalayas to about 7,000 or 8,000 feet, and the antlers procured from the 'ringal' forests are perhaps thicker, if not longer, than those of Central India. On level soil and in damp localities the sambhar, though retaining his bulk of body, seems incapable of growing fine horns, but everywhere he affords the best of hunting.

The spotted deer is perhaps the most common, as it is the most beautiful, of the Indian deer, but is not found east of the Bay of Bengal. The stag carries fine antlers for its size, and in the spring, with its pure white spots on a rufous ground, and the dark grey of throat surrounding a white gorget, presents a most graceful sight. The smaller hog deer, an inhabitant of the alluvial flats from the Punjab to Burma, is dull brown in winter though feebly spotted in summer. It is not gregarious, so that the sportsman will not have the pleasure, as in the case of the spotted deer, of seeing a herd of some hundred strong leaving the forest at evening or returning to it in the early morning. In the Himalayas the hornless musk deer is found, and the male is assiduously hunted by the natives for the so-called pod, which is a gland in the abdomen. The list of deer is completed with the addition of the mouse deer, animals about a foot in height, of

which there is one species south of the Narbada River and two others in Burma.

There are three pigs in India: the Indian wild boar, the Andamans species, and the pygmy hog from the foot of the eastern Himalaya. The first is widely spread throughout the Peninsula and in Burma, and does much harm to the cultivated crops. He is probably the most courageous animal in the country if not in the world, standing his ground against the attacks of man or of the larger carnivora, and often scorning to fly when safety might be easily secured. The wild boar is found up to considerable elevations in the Himalayas, and frequents both deep forest and open grassy plains. He is best known to the world through the sport of 'pig-sticking', but a study of his habits would perhaps afford other interest, while his sagacity, as evidenced by the accuracy by which he forecasts the approach of wet weather and the means he takes to shelter from it, is undoubted. Pigs.

The ant-eaters are three in number, and have little economic and no sporting value; and the same may almost be said of the whales and porpoises, though some of the latter which frequent the great rivers of the Peninsula and of Burma are peculiarly interesting to watch, perhaps because of the impression on the mind that dolphins should not be at home a thousand miles and more from salt water. Ant-eaters, &c.

The birds of India have been almost exhaustively described by Blandford, who deals with 593 genera and 1,617 species, and it is impossible within the space afforded in a short article to take more than a cursory glance at a few of the principal genera, though most birds are of economic interest in regard to the good or evil they cause to agricultural or forest crops, or to the protection they afford against insect pests. Ravens, crows, and magpies are common; jackdaws and choughs are frequent in the Himalayas; magpies, some of beautiful plumage, are distributed throughout the plains and hills, and in the latter nutcrackers are found. Titmice are common and the thrushes are extremely well represented; Bird

Ravens and crows.

while bulbuls of various species have an oriental reputation as songsters, though their notes cannot compare with several of the birds kept for that purpose in Europe. Wrens, warblers, shrikes, orioles, mainas, starlings, fly-catchers, robins, redstarts, forktails, weaver birds, finches, and many other small birds appear to the observer to be common in every suitable locality; for men do not wage war against them as in some continental countries, and the professional bird-catcher, with his nets and long slender wands smeared with bird-lime, is not too much in evidence, though the fact that these men are expert is testified by a visit to the bird-bazaar of any large town.

Woodpeckers, kingfishers, and owls.

Woodpeckers are strongly represented by fifty-five species, and kingfishers by eighteen, which is quite appropriate in a land of forests, rivers, and marshes. Swallows and swifts are common; there are seven species of night-jars and thirty of cuckoos, many of these latter possessing brilliant plumage. Parrots are in many places an inevitable incident in the landscape, while of owls there are screech, long-eared, wood, fish, and hawk-owls; the spotted owlet frequenting the habitations of man and being often visible by day.

Birds of prey.

The Indian birds of prey are a source of wonderment to the new-comer, who is accustomed to see these species destroyed in favour of more useful birds. But tropical lands would be in evil plight if deprived of the scavenging of the numerous vultures and kites, while the falcons and hawks help to keep exuberant bird-life within limits. Amongst the most remarkable of these birds of prey is the lammergeyer, with a marked taste for carrion and bones, the golden-eagle, and the hawk-eagles of the forest, the latter being particularly fierce and pertinacious hunters. The crested serpent-eagle is an interesting bird; while buzzards, goshawks, and sparrow-hawks are frequent. Of true falcons the peregrine, the shahin, and the laggar, hobbies, merlins, and kestrels are all present, and, as hawking is considered to be the sport of princes in the East, much trouble is taken to train the various species to the use of man.

Coming to the more generally edible birds, pigeons of many kinds, some most beautifully coloured, are numerous; while doves swarm in most parts of the open country. Sand-grouse are shot in hundreds in the dry north-west of India; while so-called game-birds, including pea-fowl, pheasants, jungle-fowls, partridges, quails, and others, are represented by eighty-one species. The pheasants are especially handsome and sporting birds; while the jungle-fowl affords good shooting if properly driven in suitable localities; as a rule it prefers to seek safety on foot. Partridges are numerous; in the plains the black, grey, painted, and swamp partridges are sporting birds; in the hills the chakor or red-legged partridge is common, the snow-partridge and the snow-cock being found at high elevations. The quail shooting in India is well known, the quail being first attracted by call-birds and then walked up to a line of guns. Game birds.

The cranes are mostly migratory, appearing in large flocks in the winter months, but the 'sarus'-crane is resident and is a familiar object in the village lands. Bustards are fairly numerous; the great Indian bustard affecting the open plains in the drier portion of India, while the plover family is found all over the country, and woodcocks and snipe are abundant locally in the cold season, the first in the hills, the other in the plains. Cranes and bustards.

The aquatic birds of the most importance are storks, ibises, herons, flamingoes, swans, geese, and ducks. Most of the European species of duck visit India, but there are also some permanent residents, such as the whistling-teal, the cotton-teal, and the spotted-bill duck. This short list gives of course but a superficial insight into the bird-life of the Indian Empire; no mention has been made of the sea birds and of other less important but yet interesting genera; yet perhaps sufficient has been written to show how abundant are the birds and how they must affect the welfare of the country either beneficially or adversely. Aquatic birds.

If the destruction of human life is a criterion of economic importance, then that of the reptiles of India far exceeds Reptiles.

that of the mammals. There are 153 genera with 558 of the former, but it must be remembered that while the increase of destructive mammals is in present conditions impossible, that of snakes is little affected by the spread of population and cultivation. It is probable that the registration of death by snake-bite would in most districts attract much less attention than if recorded as due from man-eating tigers.

Crocodiles. The crocodiles of India are three in number; of the two 'magars' one frequents fresh and the other salt water; both are carnivorous and indifferent whether they partake of human or animal flesh. The third is the fish-eating gavial, but instances have been known of it attacking man, though with what object is uncertain. The magars appear to be keenly sensitive to vibratory sounds; they are attracted by footsteps and lie in wait till their victim enters the water to drink, when it is seized by the snout and drowned in deep water. The writer has seen on one occasion an elephant seized by the trunk by a small magar, and on another watched a larger specimen swimming under water with a deer in its jaws. During the hot season magars often excavate caves in the sandy banks of streams, where they lie protected against the sun's rays. They will travel by land, generally at night, for considerable distances when it is necessary to change their hunting-ground.

Tortoises and turtles. There are land and water tortoises and river and sea turtles; the herbivorous species being edible, while the carnivorous species are dangerous to the man or beast who enters their domain. The natives catch them by diving into the tanks and feeling along its muddy bottom with their feet. Then they rise to the surface holding one of these repulsive animals far above their heads, guarding themselves as best they may against the snapping jaws of the captive. It is interesting to watch the small boys of the party seated beside the stranded tortoise awaiting silently with an axe till the head shall protrude from the shell, when it is severed with an unerring blow and the flesh then boiled down for the extraction of oil.

Lizards and snakes are extremely numerous and varied, though the latter, considering their numbers, are quite infrequently met with. There are two species of python in India, attaining an extreme length of about 20 feet. They are sluggish and slow in their movements, are semi-arboreal in their habits, and destroy deer and other animals. To a native of India all snakes are poisonous, which is an attitude best adapted for safety; for it is difficult to ascertain whether a live snake has solid, grooved, or perforated fangs. The sea-snakes may be classified as invariably poisonous; of the land-snakes the hama-dryad, reaching to over 12 feet in length, the cobra with spectacle markings, the king-snake, and the karait are all deadly. Amongst the vipers Russell's viper is but too common, and the kappa of Upper India is as fierce and agile as the first-named is sluggish. Lizards and snakes.

Fish form an important article of diet in all rice-eating countries, for some relish is required to discount the tasteless monotony of this starchy food. Thus the Burmans and some aboriginal races like the Tharus prepare a powder from fish which has first been allowed to putrefy, and find that this imparts a relish; some extract a most penetrating oil from the shells and heads of prawns which produces the same effect; while others again are fond of the gelatinous substance yielded by the fins of shark and ray, and enjoy the rank oil extracted from their livers. The catching and curing or the scientific putrefaction of fish are therefore important industries, especially in the east of the empire; while inland and towards the west, where wheat and millets afford the principal grain-foods, the people are content to eat fresh fish, chiefly in curries. Fish.

There are no salmon or trout in India, but the salt-water fish are abundant and good for food. Among the latter are the hilsa, belonging to the herring family, the begti, a kind of perch, mullet, the mango-fish, the pomfret, the tunny, the seerfish, and others. The fresh-water fish include the cat-fish, which is scaleless, and, in the case of the 'gunch', grows to a length of 6 feet; the carp,

all of which are edible, include the rohu and the famous mahsir, which affords as good sport as can be desired. Other carp are spotted and of smaller size; they rise to a fly, and in their subsequent behaviour resemble the trout, and are therefore so called by the Anglo-Indian fisherman.

The names and qualities of Indian fish are little known to the European resident, who confines his attention to comparatively few species; but a visit to the fish-market at Khulna when the Sundarbans fishing-boats come in to discharge is an interesting and instructive experience. Here are fish of all sizes, from whitebait up to the fish 100 pounds in weight; shrimps of the smallest and prawns 8 inches or more in length, fish repulsive and beautiful, scaleless and silvery, all being bought up for dispatch to Calcutta, where presumably none will be wasted; the finest go to the tables of the wealthy, the rest to be made up into pastes, powders, oils, and condiments; and with the ebbing tide each boat will drop down the stream, disappearing in the network of creeks, so as to be ready to take toll of the next harvest brought by the rising tide.

Insects

Insects are of economic importance in disseminating plant-life or in destroying superabundant vegetation; in acting as hosts for lower organisms which may attack man or beast, and in many other ways. In climates and physical conditions so propitious to the life of insects as are those of India, it might be expected that they would be numerous in a marked manner, and this is indeed the case, as is proved, for example, when of moths alone over 5,600 have been described for this country. Though the influence of insects in the tropics was for long overlooked, bacteriological research has of late years aroused mankind to its importance. We were acquainted with the destruction caused by locusts, and were forced to a study of their life-history so that they might be destroyed before arriving at maturity. Attention had been also drawn to the ravages of insects in the case of any specialized cultivation such as tea, to the defoliation

of fine plantations of teak and other valuable trees, to the attacks of bark and other borers, only to discover that an alteration in the methods of culture might be more effective than the attempted destruction of insect life; in short, that prevention was better than cure. But it is only comparatively recently that malaria, the most deadly of Indian diseases, was traced to the mosquito, that the flea was proved to be a necessary incident in the spread of plague, and that the tick was a force to be reckoned with in the lives of domestic cattle. It seems probable that continued research in this direction will open out new fields of knowledge, and that in consequence better means of protection against insect pests will be provided. Such a result will of course be all for good, for, putting aside the more serious matters of mortality amongst men, cattle, and vegetation, there remains the fact that insects play a most important rôle in the tropics. When human beings have to live in insect-proof rooms as in many parts of India, when domestic cattle have to be protected by netting from insect attack, when the healthy have to spend much time in warding off onslaughts to which the weak and sickly ultimately succumb, the matter assumes such importance that no expense should be spared to find some method of defence which shall be, perhaps in a similar way, as successful as the war now being waged against malaria, yellow-fever, and other diseases in various parts of the world. The first step in this direction would be the wider dissemination of knowledge with regard to the life-histories of useful and harmful insects.

Silk-worm.

Two insects which have considerable effect upon the commerce of the world may be briefly noted upon before closing this article. The first is the silk-worm. India possesses at least three purely indigenous silk-worms which feed on the foliage of jungle trees or are semi-domesticated on the castor-oil plant. In Bengal and parts of the United Provinces, however, mulberry-fed worms are reared, but the industry is not so large as to prevent large imports of raw silk from China and elsewhere; and

though local factories still support some thousands of workers, yet it is in the production of silk textiles that India now excels rather than in the quality or quantity of the raw material it produces. The country receives always an increasing amount of imports of raw silk and continues to yield a decreasing amount of manufactured material, so that the ultimate fate of the hand-loom workers who for centuries have produced beautiful and costly brocades may be easily foreseen.

Lac-insect.

The future of the lac-insect is much more hopeful from an economic point of view; the exports of the product of this insect grow almost yearly and amount, according to the latest statistics, to 19,000 tons of lac, valued at over £1,750,000 sterling. As is well known, the lac-insect lives on the tender twigs of certain forest trees and on some cultivated pulses, where, having fixed itself by its beak-like mouth, it exudes a protective cell of resinous matter. Within this cell the mother insect gives birth to its myriad young, which swarm out from the air-holes in the cell to form new colonies. The insect requires but little assistance from man, and that chiefly in placing the new brood on suitable trees and protecting it from insect and other enemies; so that as the area of forest is large and the light labour of sowing and collecting the harvest is not objected to by the forest tribes, there seems no reason why commerce in lac should not be much extended by systematic operations, in which the Forest Department of the Central Provinces has already taken the lead. In this manner only would the present fluctuations in price, due to an uncertain yield, be ultimately removed.

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CHAPTER IV

AGRICULTURE

By J. S. Cotton

In India agriculture forms the one predominant industry to an extent which is difficult for those to realize who are familiar only with the conditions prevailing in England. According to the occupation returns of the Census of 1901, about two-thirds of the total population of 294 millions are supported directly by agriculture proper and the subordinate industry of cattle-rearing; but if those supported indirectly be included, it has been estimated that the proportion would rise to nine-tenths, leaving only one-tenth for all the towns inhabited by as many as 5,000 persons each. And this proportion holds good almost uniformly throughout the country, apart from the sea-ports, the historic capitals, and a very few manufacturing centres. The actual pressure on the land varies, of course, according to the conditions of soil and rainfall. Whereas the fertile and well-watered alluvial plain of the Ganges basin supports upwards of 400 inhabitants per square mile, the desert in the west of Rajputana has barely five.

Predominance of agriculture.

It will, therefore, be readily understood that the annual harvests are a subject of supreme concern, not only to the cultivators themselves, but also to the Government, which nowadays accepts responsibility for saving life in case of famine. As a former finance minister epigrammatically said, the Indian budget is always a gamble against rain. Should the monsoon fail over a large area, as is liable to happen in any year, all industry at once ceases, and the food for countless numbers without employment and without money must be drawn either from local stores or from imports. History preserves the record of former famines in which millions died of starvation and the land lay uncultivated for years. The extension of canals for irrigation has protected certain tracts from the danger of drought;

Famine and pressure on food-supply.

railways have enabled supplies of grain to be collected from a distance and hurried to the distressed region; and administrative foresight has provided a systematized procedure for combined work and relief known as the famine code. An embargo upon exports forms no portion of this code, for experience has taught that even in the worst seasons India (with Burma) always grows sufficient food for all its inhabitants. Indeed, the surplus crops intended for exportation under normal conditions are spontaneously diverted for local consumption in a lean year. Thus it has come about that the spectre of famine, though never far away from the minds of the people, has lost half of its terror in recent times.

Another danger incident to Indian agriculture is also now recognized to be less formidable than was once thought. When the immense population was first ascertained by census in 1872, far exceeding any previous estimate, and when the habits of the people in reference to marriage were taken into consideration, it was not unnaturally argued that, in the absence of war, famine, and pestilence, the rate of increase would rapidly exceed the capacity of the soil to support the growing numbers. Whatever may happen in the remote future, the four subsequent enumerations have failed to confirm this fear. They have indeed shown a steady increase, due partly to extensions of territory and partly to more accurate counting. It is notable, however, that the highest rates of increase are to be found in tracts that fall under two classes: either where waste land is still abundant, as in Burma and the Central Provinces; or where the fertility of the soil is inexhaustible, as in eastern Bengal and the Malabar coast. Other considerations, too, require to be taken into account. If famine has become less formidable, plague has recently made its appearance, and malaria is present almost everywhere. The growing demand for labour in other industries and emigration are factors of minor importance, though not negligible. More significant from the point of view of agriculture are the introduction of improved processes and implements, the growth of special crops for export, and the

extension of irrigation. Comparing the best cultivation with the worst, bearing in mind the demand for grain and raw produce throughout the Western world and also the stimulus supplied by the several agricultural departments, there seems little reason to doubt that production in India generally will keep pace with increase of population.

Physical conditions.

Though on the map India may seem to present a simple and uniform appearance, few countries show greater variation in climate, soil, and other physical conditions. It extends from the eternal snows of the Himalaya to the tropical forests of Malabar, and from the arid desert of Baluchistan to the steaming swamps of the Sundarbans. While Cherrapunji on the face of the Assam hills has the highest rainfall recorded on the globe (460 inches), in Upper Sind the year often passes without any precipitation at all. So, too, with regard to temperature. Throughout north-western India frosts at night are of common occurrence during December and January; in the same region, and more particularly in Sind, the thermometer often rises above 120° F. in the month of May; while in the extreme south, on the Malabar coast, a uniform temperature is experienced, the mean of the month never falling below 77° or rising above 82°.

Soils.

Apart from the conformation of hill, valley, and plain, the physical conditions that determine agriculture are mostly differences of soil and rainfall. The soils of India may be divided into three main classes, ultimately dependent upon geological formations. Alluvial soil is characteristic of northern India, covering the vast Indo-Gangetic plain and filling the valleys of the Brahmaputra and the Irrawadi; it is also found in the low strips along the western and eastern coasts and in the deltas of the Madras rivers. Here almost any crop can be grown with favourable rainfall, rice predominating wherever the water-supply is adequate. Next comes the black cotton soil of the Deccan trap, covering most of the central plateau and extending into Gujarat. Though geologically the same, it exhibits great variations directly affecting agriculture. In certain areas, where the soil is thin and the rainfall likewise

deficient, it yields the poorest and most uncertain crops. In other places it is so deep that it cannot be irrigated and becomes unworkable during heavy rain. When spread out at a moderate depth in broad valleys and low-lying plains, it yields the cotton from which it has been named. Other characteristic crops are millets, oil-seeds, pulses, and wheat. The third soil is that derived from the disintegration of the crystalline rocks which cover the whole eastern half of the Peninsula, from Mysore to Chota Nagpur. This varies in fertility as much as does the black cotton soil, and it also varies greatly in colour, from red to a brownish yellow. Where deep it yields good crops, and everywhere responds to irrigation, which is chiefly conducted from tanks. Rice is the staple crop, but many others are grown. From the point of view of chemical composition, all the soils of India are deficient in phosphoric acid, in nitrogen, and in organic matter. Despite continuous cropping and the small use made of manure, there seems little evidence to support the view that they are deteriorating in fertility.

Rainfall.

Rainfall is of even more importance than soil, for without sufficient and well-distributed rain the most fertile soil will yield little or nothing over the immense area to which artificial irrigation cannot be extended. Throughout the greater part of India the rainfall is brought by the water-laden winds of the south-west monsoon, which is itself a seasonal extension across the equator of the south-east trades in the Indian Ocean. The monsoon reaches India from two directions: from the Arabian Sea, striking direct upon the west coast and thence penetrating eastward and northward; and from the Bay of Bengal, reaching first Burma and Assam and thence deflected westward along the Gangetic plain. The heaviest precipitation is, of course, upon the mountain ranges, and the lightest is in the Deccan behind the Western Ghats. The normal arrival of the monsoon is early in June at Bombay, a week later in Bengal, and three weeks later in the Punjab. The normal duration of the rainfall is about three months, ending early in October, and the total for the whole period may be roughly estimated at an average, for all India, of 40 inches.

But the rainfall is by no means continuous, being liable to prolonged breaks; and the agricultural result depends as much upon a favourable distribution as upon the amount. Cultivation begins as soon as the first showers have moistened the surface, and the *kharīf* or autumn harvest of food-grains and cotton is ready for reaping before the end of the year. Such is the general course of the agricultural season. But fortunately the whole country is not entirely dependent upon one monsoon. In the south, especially along the Coromandel coast, great benefit is derived from the north-east monsoon (more correctly, the retreating south-west monsoon), which brings frequent and heavy storms from October to December, filling up the irrigation tanks. So, too, in northern India, the unirrigated *rabi* crops of wheat and oil-seeds largely depend upon winter showers which have their origin in Persia; while Assam and Bengal are subject to local storms, sometimes of great severity, during the hot season, which are of service for tea, jute, and an early crop of rice. It may be added that the deposition of dew during the cold season largely contributes to the success of the *rabi* or spring harvest.

Setting aside the risk of floods, which are only partial in their destructiveness, the following regions may be described as safe from drought by reason of regular and abundant rainfall: Lower Burma, Assam, Bengal, and the west coast. Considerable portions of the United Provinces and the Punjab, and also the deltas of the Madras rivers, are equally protected by irrigation canals. Throughout the rest of the country, amounting to nearly a million square miles, a failure of the monsoon is ever liable to occur, in greater or less degree. The most precarious tract of all is part of the Bombay Deccan, where the annual rainfall rarely exceeds 30 inches and irrigation on a large scale is impracticable.

Land tenures.

In accordance with immemorial custom, all land[1] in India is held subject to the liability of a payment to the State. Whether the landholders should be regarded as absolute

[1] [B. H. Baden-Powell, *The Land Systems of British India*, 3 vols., Oxford, 1892; *Indian Village Community*, London, 1899.]

proprietors, and whether their payment should be called revenue or rent, are questions immaterial to the present purpose. Suffice it to say that, at least throughout British India, the landholder, under whatever name, possesses an almost unrestricted power of sale or mortgage, while his rights pass by the ordinary rules of inheritance, subject always to the payment of the assessment due to the State. Nor is it necessary here to discuss the difference between an assessment fixed in perpetuity, as in Bengal, and an assessment liable to change after a term of years, such as prevails generally elsewhere. The weight of the assessment might conceivably affect agriculture, if unduly heavy; but it is calculated to average less than 6 per cent. of the gross produce, rising to 20 per cent. in Gujarat, the garden of India. More important is the fundamental distinction between *zamīndāri* and *rayatwāri* settlement. The former, which prevails generally throughout northern India, treats the landholder, whether an individual or a community, as possessed of certain inherent rights, usually covering waste land and implying the creation of sub-tenures. The latter, found in Bombay, Madras, Burma, and Assam, regards him merely as an occupant, but with the privilege of inheritance and transfer. Under the *zamīndāri* system the relation of landlord and tenant commonly arises; and the tenant's security, originally based on uncertain custom, has now been confirmed by a series of legislative enactments, which protect him from arbitrary eviction or excessive enhancement of rent. Under the *rayatwāri* system the State is the landlord, and the occupant's security depends upon the terms of the settlement tenure, as described above.

Despite this broad distinction, which affects legal rights rather than agriculture, under both systems alike the actual cultivator is almost universally a small holder, who tills his little plot by his own labour and that of his family, with little assistance from outside. The size of the holdings over such an enormous area varies, of course, according to the fertility of the soil and the pressure of population. In favoured tracts, such as the delta of the Ganges, two or three acres may be sufficient to support

a family, whereas in the dry uplands of the Deccan a peasant's holding ranges from twenty to fifty acres. And it must be borne in mind that these small holdings rarely consist of definite, self-contained fields. Both Hindu and Muhammadan law give equal shares to all sons, without any rule of primogeniture. Consequently, as in France, there is an ever-increasing tendency for rights in land to become subdivided in minute and complicated fractions. Nor is this all. The original holding may often have consisted, for certain reasons, of several plots at a distance from each other. When these are subdivided, the result is the same as that which occurred in the 'open field' system once prevailing in England—a number of isolated patches, inextricably mixed up, none of which can be cultivated with profit, for not only is time wasted in reaching them, but also each separate patch is too small to allow of proper tillage. The consolidation of these fragments into economic holdings is one of the most pressing problems in the improvement of Indian agriculture.

Agricultural labour.

According to the occupation returns of the Census of 1901, the total number of agricultural labourers and those dependent on them exceeded 35 millions; and it is notable that their proportion to landholders and tenants is considerably higher in native states than in British territory, the average for all India being as 12 to 52. Though small holdings are the rule everywhere, this is not inconsistent with the existence of a large landless class, who have been from time immemorial hereditary serfs. Certain castes, such as Brahmans and Rajputs, who are privileged landholders, are not permitted to hold the plough, and consequently all agricultural operations have to be performed for them by hired labour. Among all classes of cultivators occasional assistance is required at the seasons of sowing and reaping, of which the rice-harvest in Lower Burma affords a conspicuous example. Where population is dense and the bare necessaries of life are easily obtained, there must always exist a surplus of unemployed, which tends to keep down the rate of remuneration; and in India this tendency is emphasized by the fact that the surplus is

represented by the depressed and so-called 'untouchable' castes.

Wages.

Slavery, in its worst forms, has never been known in India; but predial serfdom, where successive generations served a master through life, was a recognized system until British law refused to recognize the bond, and traces of it still survive without any manifest hardship. When labour is permanently employed, as by the superior class of land-owners, remuneration takes the form of regular subsistence, with perquisites, such as an occasional piece of cloth, a gift towards expenses of marriage, and a small money wage. The ordinary farm labourer receives a ration of grain, and sometimes a proportion of the crop at harvest; but payment in cash instead of in kind is becoming more common, as also in the case of rent. Whether wages have increased in proportion to the increase that has taken place in the price of food is a difficult problem. If official figures can be trusted, agricultural wages in Bengal have risen during the past thirty years by nearly 40 per cent., but in Bombay and Madras by only 10 per cent., while in Oudh they have actually fallen. It is certain that in the canal colonies of the Punjab labour is now scarcely obtainable, even at exorbitant rates.

Agricultural implements, &c.

Agricultural implements are of a primitive kind. The plough, drawn by bullocks, is everywhere in use, and often the only implement used for preparatory tillage. It is of the type described by Virgil—made almost entirely of wood, with a small iron share, cheap and easily repaired. In most parts of the country, where the soil is light, the plough also is so light that the cultivator can carry it afield on his shoulders, and a yoke of puny cattle can draw it. In the same tracts the plough itself is used for sowing the seed, which is dropped by hand through a bamboo tube as the plough works. In the deep black soil of the Deccan a much heavier plough is required, sometimes with six yoke of bullocks, to loosen the surface and break up the huge clods. Here also subsidiary implements are in use, such as scarifiers, seed-drills, and bullock-hoes. Within recent years thousands of turn-wrest ploughs made of iron

have been introduced, chiefly in Madras, Bombay, and the Central Provinces, through the intervention of the several agricultural departments. The simplest implement of all, used as a roller to level the surface, is a rectangular beam drawn by bullocks, the driver often standing upon it to add to its weight. Reaping is everywhere performed with a rude sickle, the ears of grain being sometimes cut off high up on the stalk, and sometimes the entire stalk is uprooted. The grain is trodden out on a threshing-floor by cattle walking round and round, which are sometimes (but not usually) muzzled. It is then winnowed from the chaff by being poured from a height in face of a strong wind, and is finally cleaned in a sieve. Carts vary greatly in size and construction. The best are found in the Bombay Deccan and the Madras Carnatic. The only draft animals are the bullock and (to a limited extent) the buffalo, except that the camel is used in the sandy tracts of Rajputana. For hand labour the spade is unknown, its universal substitute being a sort of mattock, called *kodāli* in the north and *māmūti* in the south. The wheelbarrow, so universal in China, is likewise unknown, loads of earth being carried in baskets on the head, usually by women.

Harvest seasons.

The agricultural year may be said to begin with the arrival of the monsoon in June, the preceding hot season being a time of idleness for the cultivator. As soon as the first showers have fallen to moisten the sun-baked soil, and in some cases even earlier, ploughing is actively carried on to prepare a proper tilth for the seed. This operation is often repeated several times, between the intervals of heavy rain, until the surface is pulverized. The precise time for sowing is largely determined by auspicious indications. Not much attention is paid to the selection of seed. It is generally sown by a drill, but sometimes broadcast. Weeding and hoeing are rarely done. When the grain ripens it has to be protected against birds, which swarm everywhere and succeed in appropriating a portion of the crop. With a favourable monsoon, sowing should be finished by the end of July, and the several crops should be ready for reaping from September to December. This is the *kharīf*

or autumn harvest, which includes the more important food-grains, such as rice, millets of many kinds, maize, &c., and also cotton. The *rabi* or spring crops, of which the most important are wheat, oil-seeds, and gram, are sown in October and November, and ripen in March and April. So far as they are not irrigated, these crops depend partly upon the moisture left by the monsoon, partly upon dew, and (in northern India) upon occasional rain-storms in the cold season. They are liable to damage from frost and blight.

Such is the general course of the agricultural year over the greater part of India, but there are some exceptions. In Bengal, for example, where the rainfall begins soon and is generally abundant, an early crop of rice is sown during the hot season and reaped in August, and the same applies to the valuable crop of jute. So again in Madras, which enjoys two monsoons and an equable temperature, there are four seasons for sowing, of which the three most important coincide with those already mentioned, while the fourth is the dry season (from January to March).

Double cropping.

Though there are two harvests in the year, it must not be inferred that cultivated land throughout India normally bears two crops. Double cropping is possible only where the soil and water supply permit, but there is evidence that it is extending with improvement in the methods of cultivation, stimulated by the rise in the price of all agricultural produce. For all India the area twice-cropped amounts to about one-seventh of the total cultivated area. In Bengal and the United Provinces the proportion rises to one-fifth, whereas in Bombay it is almost negligible. The commonest second crops are pulses or oil-seeds, sown for the *rabi* harvest after a *kharīf* crop of rice has been reaped. In the Madras deltas, irrigated from canals, three crops of rice can be raised in the year.

Rotation of crops.

Rotation of crops is generally practised outside the rice-growing tracts, though not in a rigid manner. Traditional experience has taught the cultivator that fertility cannot be maintained if the same crop, especially of an exhausting nature, is taken from the same field in consecutive years.

In the United Provinces the regular rotation is to grow a *kharīf* and a *rabi* crop in alternate years. The common custom of growing mixed crops serves in many respects the purpose of rotation. Pulses and oil-seeds mixed with cereals not only ripen at different times, but with an uncertain rainfall one may succeed when the other fails. Pulses exercise another beneficial influence, inasmuch as they enrich the soil with nitrogen which is assimilated from the air by certain micro-organisms in their roots. As food they are also valuable as supplying elements not found in rice.

Fallows.

Bare fallowing is believed to be practised only on large holdings in the black cotton tract of Broach, in Bombay, where the fields are rested for a year, being carefully tilled during the time. In northern India, under the standard rotation of alternate *kharīf* and *rabi*, the former is followed by nine months' rest and the latter by an interval of nearly three months. Elsewhere, and especially in the south, land which has been reduced in fertility and becomes overgrown with weeds is allowed to lie waste for years. In Bombay about one-fifth of the total occupied area is returned as fallow, in this sense; while in Sind, owing to fluctuations in water-supply from the canals, this proportion rises to one-half.

Manure.

Inadequate manure is the chief fault in Indian agriculture. For this the custom—indeed, the necessity—of using cow dung for fuel is the cause. The cultivators are everywhere alive to the importance of manure, but the material is lacking. Fields in the immediate neighbourhood of the village site and the farm-shed do receive all the manure available in the form of dung and house refuse. Garden crops, tobacco, and sugar-cane cannot be grown without an abundant application of manure. It is also recognized that irrigated land demands manure. Sheep and goats are often folded on the fields at night, for which the shepherd obtains some remuneration. Green manuring is sometimes practised, by ploughing in a leguminous crop; and in southern India leaves of trees and weeds are utilized in this way. Oil-cakes of various kinds are coming into use

for garden crops; and near large towns the prejudice against night-soil, in the form of poudrette, is gradually disappearing. Not much can be hoped from artificial manures, though these are used to some extent by European planters.

Irrigation[1].

It has been said epigrammatically that the main difference in principle between English and Indian agriculture is that the object of the English farmer is to get rid of the superfluous water by drainage, while the object of the Indian *rayat* is to retain the moisture in the land. In some parts of the country, as in rainless Sind, no crops can be grown without irrigation; and over other large areas irrigation is the only safeguard against the vicissitudes of the monsoon. The area thus protected is about 18 per cent. of the total cultivated area, the proportion rising to 25 per cent. in the northern alluvial tract and falling to 3 per cent. in the Deccan. Irrigation can be effected from several sources: (1) from canals, chiefly in northern India, which supply more than a third of the total irrigated area; (2) from wells, which come next in importance and are more widely distributed; (3) from tanks or artificial reservoirs, mostly in the southern crystalline tract; and (4) from 'other sources', which means from natural depressions, flowing streams, &c.

Canals.

Canals naturally attract most attention, if only because they have been almost entirely constructed by government, and therefore accurate statistics are available. The largest and most successful are in the Indo-Gangetic plain, where the snow-fed rivers are crossed by weirs on leaving the hills and their life-giving water is diverted under the control of the engineer. In the United Provinces, where large works were first begun, the Doab or tract between the Ganges and the Jumna has thus been effectually saved from all risk of drought. Yet more striking are the recent undertakings in the Punjab, by which the desert uplands between the several river systems are being gradually converted into fruitful fields, and prosperous colonies of immigrant husbandmen are everywhere springing up.

[1] [R. B. Buckley, *The Irrigation Works of India*, London, 1905.]

FIG. 6. Soil.

FIG. 7. Chief Irrigation Canal Works.

Lower down the Indus, Sind still awaits the construction of a barrage across the river which shall guarantee a permanent supply of water to its rainless land. A different system of canals is to be found on the east coast of Madras, where the rivers of the Deccan find their way to the sea. Here, following a plan of indigenous origin, an anicut, or dam, is constructed at the head of the delta, from which canals and distributing channels are led in all directions, thus making the entire area one continuous rice-field, fertilized by silt and yielding more than one crop in the year. Mention may here be made of a bold engineering feat in the extreme south of Madras, by which the rain that falls to excess on the western slope of the Ghāts has been diverted through a tunnel to the thirsty plain of Tinnevelly in the east. In Bengal, the two systems of the Orissa and the Son Canals must be regarded rather as safeguards against famine than as remunerative works. In Bombay (excluding Sind) canals are of minor importance, being usually constructed not from rivers but from storage reservoirs, and chiefly used for irrigating sugar-cane; but larger works have recently been begun. In 1911–12, the total area in British India irrigated from government canals was 18 million acres, and the net receipts were 2¾ millions, giving a return of more than 6 per cent. on the total capital outlay of 41½ millions. The annual capital expenditure on irrigation works is about 1½ millions. Canals in India are hardly used at all for transport by water.

Wells.

Wells are the indigenous method of irrigation, and are always constructed by the cultivators themselves, though government affords encouragement by advancing money for the purpose, and also by exempting the land thus irrigated from enhancement of revenue. The total area irrigated from wells has been roughly estimated at 13 million acres, mostly in the United Provinces and the Punjab, with a smaller proportion in Madras and Bombay. The common method of raising the water is by a large leathern bag, fastened to a rope passing over a pulley, the other end of the rope being attached to a pair of bullocks, which walk down an inclined plane corresponding to the

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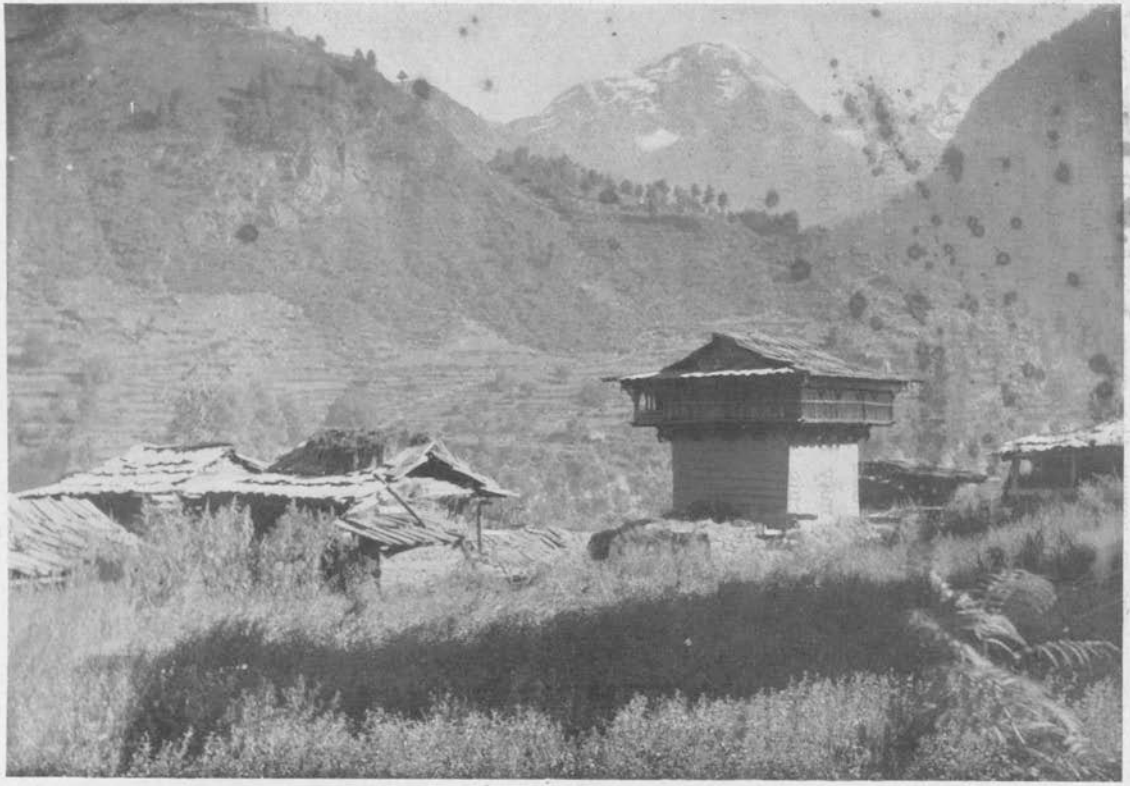

PLATE IX. PARBATTI VALLEY

(Sir S. Eardley-Wilmot)

PLATE X. TALKATORA TANK, JAIPUR

(Visual Instruction Committee)

depth of the well. Another method used in some parts is the Persian wheel, consisting of an endless chain of water-pots, which is also worked by bullocks, in this case walking round a circular track. A third method, in use where the water is not far below the surface, is the *dhenklī* or *picottah*, a lever pivoted on a post and worked by manual labour. A permanent well, lined with masonry, may cost as much as £30 to construct, going down as deep as 40 feet. Many wells, however, are only of a temporary character, easily dug and readily abandoned. In the Punjab the area irrigated from a well (with more than one leathern bag) is said to be as much as 12 acres, but elsewhere the average does not exceed 3 or 4 acres. Well-cultivation is laborious, but also profitable; and the recent increase in the number of wells is a sign of agricultural prosperity.

Tanks.

Irrigation from artificial reservoirs, or tanks, is also indigenous, though confined to certain parts of the country, of which the native states of Hyderabad and Mysore are conspicuous examples. These tanks may be lakes covering several square miles, which have been formed by damming up the head of a valley; or a chain of little pools drawn off from a river; or even, as in Bengal, depressions excavated in the level surface. The total area irrigated from these sources is estimated at more than 8 million acres, not including the area irrigated from natural depressions and flowing streams.

Special crops: Rice.

Of the total cultivated area in British India, for which alone statistics are available, about 80 per cent. is devoted to food-grains and pulses of various kinds, of which rice is by far the most important. It would, however, be erroneous to infer that rice is of equal importance everywhere. Where it is grown, it is grown almost exclusively, as in Burma, Bengal, and the Madras deltas. Elsewhere it is only the crop of special areas, favoured by abundant rainfall or facilities for irrigation. Numerous varieties of rice are recognized, the finest having thin translucent grains, golden in colour and scented. The cultivation is a laborious and unhealthy process, conducted from first to last in a swamp. Though sometimes sown broadcast or by drill, the commonest

method, always adopted for the finest and most remunerative varieties, is by transplantation from a seed-bed, which has been carefully tilled and highly manured. In four or five weeks after sowing, the seedlings, now 8 to 10 inches high, are ready for removal into the field. This consists of a chain of embanked plots, of which the surface has been puddled into a thin mud by repeated ploughings and sometimes by the trampling of cattle, and which require a constant supply of water while the crop is growing. The transplantation is effected by hand, often by women, each separate seedling having to be forced into the soft mud. The crop ripens, under different conditions, from September to December. The straw makes poor fodder, but excellent thatch. An acre of transplanted rice may yield 2,400 lb. of grain from 50 lb. of seed, while broadcast rice returns much less from a larger amount of seed. The total area under rice in British India is estimated at nearly 80 million acres, yielding about 30 million tons. The total exports, of which three-fourths are sent from Burma, amounted in 1911–12 to more than 2½ million tons, valued at 19 millions.

Wheat.

Wheat[1] ranks next to rice as a food-crop, though its extension in recent years is largely due to the demand for export, met by canal irrigation in the Punjab. There, and in the United Provinces, which together furnish two-thirds of the total supply, it is mostly grown by irrigation, from wells as well as from canals. In the Central Provinces and Bombay it is grown, without irrigation, on deep black soil which retains moisture long after the monsoon. In both cases winter showers are helpful to the crop, while rust and blight are more dreaded than frost. In the south, including Madras and Mysore, wheat is almost unknown. Other subordinate crops are often grown mixed with wheat, such as barley, gram, or linseed. Of many varieties, those most in favour for export are soft white and hard white. Formerly objection used to be taken to the dirty quality of Indian wheat, but now it commands a high price in the English market, being specially valued by millers for mixing purposes. The yield per acre on irrigated land,

[1] A. and L. C. Howard, *Wheat in India*, Calcutta, 1910.

which has been liberally manured is from 1,200 to 1,600 lb. The total area under wheat is estimated at about 30 million acres, yielding nearly 10 million tons. The exports vary much from year to year, depending more upon the amount of surplus than upon the price in Europe. In 1908–9 they were only 110,000 tons, whereas in 1911–12 they were 1,361,000 tons, mostly from Karachi, valued at nearly 9 millions.

Millets.

The two important millets (*Andropogon Sorghum* and *Pennisetum typhoideum*), locally called *jowār* and *bājra*, supply the greater part of the food of the common people throughout northern India, while in the south they are supplemented by a third millet (*Eleusine corocana*), there known as *rāgi*. These three crops together are estimated to be grown on 42 million acres, mostly in Madras and Bombay; and if the miscellaneous grain-crops, such as barley, maize, and the smaller millets, be added, the whole would cover a larger area, and more widely distributed, than that under rice. The millets are almost entirely consumed in the country, with an active internal trade between different parts; but of both barley and maize exports have largely increased in recent years. Millets are usually a *rabi* crop, though *jowār* is likewise grown as a *kharīf* crop. In both cases, subordinate crops of pulses and oil-seeds are often mixed with them. *Jowār* has the advantage of yielding in its stalk an excellent fodder, which may be more valuable even than the grain.

Pulses.

Of many pulses the most important is gram or chick-pea (*Cicer arietinum*), grown sometimes in rotation with wheat and sometimes mixed with it, but always as a *rabi* crop. Apart from its consumption as food by a vegetarian population, it possesses the advantage of restoring fertility to the soil. The total area under gram is estimated at more than 14 million acres, mostly in the United Provinces and the Punjab. The export of gram, as of barley and maize, has recently increased to a remarkable extent. Other pulses commonly grown are pigeon-pea or *arhar* (*Cajanus indicus*), lentils (*Ervum lens*), three species of *Phaseolus*, and two of peas.

Oil-seeds.

Oil-seeds of several kinds, originally grown for domestic use in cooking and lighting, have become an important article of export, following close after cotton and rice. Though the area under oil-seeds (excluding cotton-seed) may seem comparatively small, being estimated at only 16 million acres, more evenly distributed over the country than any other crop, the total exports in 1911–12 amounted to nearly 30 million cwts., valued at 18 millions. The most important for export is linseed, which is nowhere capable of yielding flax. It is grown everywhere as a *rabi* crop, either in rotation with rice or as a mixed crop with wheat. Its cultivation is easy, but it is liable to mishaps before it reaches maturity. Sesamum or gingelly is grown on a larger area than linseed, but much less is exported, as it is in local demand for cookery and also as a cattle-food. It is either a *rabi* crop, alternating with cotton and *jowār*, or a mixed *kharīf* crop. Other oil-seeds are rape or mustard, castor, and poppy. With them may be mentioned ground-nut (*Arachis hypogaea*), grown in the south and exported largely from the French settlement of Pondicherry; and cotton-seed, which ranks next to linseed and rape among the exports.

Sugar-cane.

Sugar-cane presents some strange anomalies. It is undoubtedly indigenous to India, which is still estimated to produce one-third of the cane crop of the world. The local demand seems to be insatiable, and yet neither the area under cultivation nor the production tends to increase, while the imports have risen to the total of 12 million cwts., valued at 8 millions. The total area under sugar-cane is estimated at 2½ million acres, of which more than half is in the United Provinces and most of the rest in Bengal and the Punjab. It requires abundant irrigation, and therefore must be grown on a soil that permits of drainage. It is propagated from sets or cuttings, which are planted in pits at the end of the cold season, and occupies the ground for ten or eleven months. The land must be very heavily manured with cow-dung and oilcake, and during early stages requires repeated weedings and also to be banked up. When ripe, the canes are crushed in iron mills, which have

now superseded the stone mortars formerly in use; and the juice is then boiled in open iron pans, the fuel commonly used being the crushed cane. The product is a crude brown stuff, called *gur* or *jāgri*, which is so much in demand that it is rarely refined. In northern India, where sugar-cane is a common crop, not more than 4,000 lb. of *gur* is obtained from an acre, whereas near Poona, where it is cultivated with canal irrigation, double that quantity would be considered a poor result. There is perhaps no Indian industry capable of more improvement than the cultivation and refining of sugar. In some parts, especially in Madras, *jāgri* is made to a large amount by tapping certain species of palm.

Cotton.

From a commercial point of view, cotton is the most important crop grown in India. Though to be found almost everywhere, even in the hills of the north-east frontier, cultivation on a large scale is concentrated in certain tracts, mostly on the western side of India, with Bombay for the chief market and seaport. The total area under cotton in British India is estimated at nearly 14 million acres, to which at least 6 million acres must be added for native states. In Berar nearly one-half of the total cultivated area is under cotton, and the crop is scarcely less important in Gujarat, where the finest varieties are grown. The outturn varies widely, according to the vicissitudes of the season; but the average may be put at four million bales (of 400 lb.), of which about half is exported, almost entirely to Japan and the continent of Europe. The average yield of lint per acre is stated to be 61 lb., only one-third of the yield in America. Cotton is generally a *kharīf* crop, sown with the arrival of the monsoon in June. A second sowing is often necessary, if the rainfall has been either too light or too heavy. The seed is drilled in rows, which permit of interculture with the bullock-hoe. For practical purposes, two main varieties may be distinguished: the common sort, easy of cultivation and ripening early, which yields a short and coarse staple; and the late ripening and longer stapled sort grown on the deep black soils of Gujarat. The introduction of exotic species and the improvement of the

cultivation have for a long time past engaged the attention of government. Few of the exotics have been successfully acclimatized, but more has been accomplished by seed selection and by experiments among different indigenous varieties. The raw cotton requires to be ginned and pressed, both of which operations are now generally performed by steam-driven machinery. The importance of the crop may be gathered from the case of Berar, where the export in a favourable year is valued at nearly 4 millions.

Jute. Among fibres, jute (*Corchorus*) ranks next after cotton. About sixty years ago jute was almost unknown, being only utilized locally for sacking and rope. Its cultivation is practically confined to eastern and northern Bengal, where it is grown upon land suitable also for rice. The total area exceeds 3 million acres, and the out-turn may be estimated at more than 8 million bales (of 400 lb.), of which nearly half is exported raw, the rest being worked up in the mills near Calcutta. It is a *kharīf* crop, sown before the end of the hot season and ready for cutting as early as July. The plant quickly grows to the height of ten feet, rising with the river inundation. The fibre is obtained (as with flax) by 'retting' or steeping the stalks in water, and then stripping them by hand. Pressing into bales is done by machinery. The price is subject to more violent fluctuations than is the case with cotton; but the crop is undoubtedly remunerative, and has permanently raised the standard of living in the tract where it is grown.

Indigo. Indigo, which for nearly a century brought wealth to European planters, is seemingly a moribund industry, owing to the competition of synthetic dyes made in Germany. As recently as 1895–6 the exports of indigo from India were 187,000 cwts., valued at 3½ millions; whereas by 1911–12 they had fallen to 19,000 cwts., valued at £250,000. By introducing fresh varieties and by improvements in manufacture the planters of Bihar are still striving to maintain a limited production; and it is admitted that the vegetable dye possesses some advantages not to be found in the chemical. A similar fate has

befallen two other vegetable dyes: *āl* (*Morinda*), once largely cultivated in certain tracts; and safflower (*Carthamus*), now grown only as an oil-seed.

Tobacco is grown very generally throughout the country, the total area being estimated to exceed one million acres. The chief centres are northern Bengal, Madura district, and islands in the delta of the Godaveri river in Madras, Gujarat, and Burma. Many efforts have been made to improve both the cultivation and the manufacture, without much success. The local product is entirely untaxed, while the customs duty has recently been raised. Nevertheless, the imports are nearly double the exports. Tobacco.

Concerning drugs and spices, it may be said that poppy for opium is going the same way as indigo. Chillies and other condiments are grown everywhere for local consumption. Pepper and cardamoms are a special product of the forest-clad hills on the Malabar coast. The two constituents of *pān-supāri*, universally chewed by all classes, are—betel leaf (*Piper Betle*), a creeper not unlike the hop, which is carefully cultivated in watered gardens, sometimes by a special caste; and the nut of a palm (*Areca Catechu*), which grows easily in certain tracts near the sea, but not in sufficient quantity to meet the demand, for the imports from the Straits Settlements are valued at £600,000. Drugs and spices.

Vegetables and pot-herbs of very many kinds are grown everywhere in gardens, especially in the neighbourhood of towns, where manure is procurable. Potatoes, first introduced on the hills, have now become common in many parts of the plains. Fruits of many kinds are also abundant, of which the mango and the orange may be particularly mentioned. The coco-nut palm, which favours sandy tracts along the coast, yields valuable products of various sorts; and more than one species of palm are tapped for toddy. Vegetables and fruits.

Of crops grown with European capital and under European supervision by far the most important is tea. The tea shrub (*Camellia theifera*) is indigenous to the hills of Assam, where in the wild state it attains the dimensions of a small tree. Assam is still the largest centre of pro- Tea.

duction, with an extension through the Western Dwars to Darjiling, while tea-gardens are also to be found in the Nilgiris in the south and in the lower Himalayan ranges in the north. The total area under tea in 1911 is returned at 574,000 acres, yielding 269 million lb., of which 261 million lb. were exported, to the value of more than 8½ millions. The cultivation and manufacture require an abundant supply of unskilled labour, which, in the case of Assam, has to be drawn from other parts of the country. The industry supports altogether more than 500,000 permanent and 87,000 temporary hands, considerably more than cotton and jute factories combined. The cultivated area and the production both show steady rates of increase.

Coffee. Coffee-planting, on the other hand, is stationary, if not declining, having suffered first from insect pests and since from the competition of Brazil. The coffee shrub (*Coffea arabica*) is said to have been introduced into southern India about two centuries ago; and its cultivation has always been confined to the hills of Mysore, Coorg, and the neighbourhood. Here the industry is pursued by Indians as well as by Europeans, but not a few of the old plantations have relapsed into jungle. The total exports in 1911–12 amounted to 241,000 cwts., valued at £900,000.

Cattle, sheep, &c. The place of cattle in connexion with agriculture is very different in India from what it is in such a country as England. On the one hand, bullocks are universally used for all operations for which horses or machinery are required in England; and the cow and her various products are held in superstitious esteem everywhere, except on the north-east frontier. But, on the other hand, beef is rejected as an article of food, absolutely by Hindus and largely by Muhammadans out of sympathy, with the result that breeding, grazing, fodder crops, and even dairying are generally neglected. Working bullocks have to be fed somehow, but cows are left to pick up what they can, and useless animals are allowed to compete for the scanty food available in the hot season. Different breeds, of course, exist, all of the same humped species (*Bos indicus*), which extends through Southern Asia into East Africa. The general colour is

grey or white, sometimes spotted. Perhaps the finest cattle in India are those bred in northern Gujarat by a special caste, known as Rabāris, which are active, strong, and docile. Other notable breeds are found in northern Madras, Malwa, and the eastern Punjab, whence they are exported to parts of the country where no attention is paid to breeding. In the Central Provinces there is a special breed of trotting bullocks. In the Gangetic delta the cattle are miserably small and feeble.

Buffaloes are everywhere in demand for their milk, which is richer than that of cows. It is only in marshy tracts that they are used for agriculture, and consequently the male calf is not always reared. No sanctity attaches to the buffalo, and he is a fit object of sacrifice.

Sheep and goats are common everywhere, especially in the south, being the charge of a special caste. Of the two, goats are the more numerous, since their flesh is preferred by all who eat meat, and they also yield milk. The fleece of Indian sheep is so thin and hairy as to be of little value, though it is woven by the shepherds into coarse blankets.

The Department of Agriculture.

Agriculture must always be a matter of supreme concern to a government which derives a large portion of its revenue directly from the land. For historical reasons this has been markedly the case in India, where the chief executive officer in a district (corresponding to an English shire) still bears the title of Collector, from his function of collecting the land revenue, and where the department under the charge of a member of the Governor-General's Council is styled the Department of Revenue (meaning only land revenue, distinct from finance) and Agriculture. While the primary duty of this department is the supervision of the land revenue, which affects agriculture in so many ways, it is also concerned with measures for agricultural improvement, and with the administration of famine relief should the crops fail.

Agricultural education and research.

In each province there is a Director of Agriculture, usually a member of the Civil Service who has received a special training, with a staff of experts in botany,

chemistry, &c. Most provinces also now have an agricultural college, where a course is taught leading to a university diploma. Experimental farms have been established in many places, and a central institute for agricultural research, at Pusa in Bihar, has been endowed by the munificence of an American gentleman. Though the work is yet in an early stage, and some disappointments have been experienced, distinct progress has been made in several directions. Approved varieties of cotton and wheat have been formed by selection, and seeds of both are now eagerly accepted by the cultivators. Iron ploughs and pumping machinery have been widely introduced in some parts. Insect pests and plant diseases have been studied with profit. The advantage of particular manures, &c., for particular crops has been determined. Not least in importance, by means of agricultural shows, practical demonstrations, addresses and pamphlets in the vernacular, the cultivators are slowly learning that government is not only desirous of helping them, but that it understands their point of view and does not despise the small things which naturally seem all-important in their eyes. It is by recognizing the conditions under which Indian agriculture can be carried on and by establishing friendly relations with the cultivators, as much as by scientific research, that any permanent advance can be achieved.

Agricultural credit.

It has always been the practice of government, inherited from native rulers, to advance loans to the cultivators for certain purposes. These advances, known as *tagāvi*, are regulated by two Acts of the legislature: one for permanent improvements, such as the construction of wells, the other for temporary needs, such as the purchase of seed and cattle. In both cases interest is usually charged at the rate of 6¼ per cent., and the total amount advanced in the year averages about £500,000. In times of famine advances are offered without interest, as being the most economical method of providing useful work for the unemployed. This system, however, perhaps because of its rigidity, has not had any very serious influence on the agricultural credit of the country.

Co-operative Credit Societies.

Greater hopes may be entertained of the co-operative credit societies, which have been started within the last ten years by enthusiastic officials and under government supervision. These vary in their methods in the different provinces; but the general principle is that of the Raffeisen plan, so successful in Central Europe, by which the societies lend to their own members on unlimited liability, the capital being provided either by the members' own deposits or by loans from central societies and individuals. Though applicable also to urban industries, the system is intended primarily for the needs of the cultivators. It has already passed out of the experimental stage, showing how it appeals to the traditions of the people for joint responsibility. Even moneylenders, who excusably manifested some hostility to the movement, are adapting themselves to it by lowering their rates of interest, and in some places are depositing money with the societies because of the security they guarantee. The objects for which loans are taken are purchase of cattle, payment of land revenue, and repayment of debts to moneylenders; rarely for non-productive purposes, such as expenditure on marriage ceremonies. Many of the societies are now self-supporting. The general experience is that loans are punctually repaid. Government is gradually withdrawing the financial assistance that it gave at first, though it exercises control through an official registrar. During the four years ending with 1912, the number of rural societies increased from 1,766 to 7,562, the total membership from 117,151 to 324,860, and the total working capital from £272,450 to £1,215,271. The rates of interest vary; but it is estimated that agriculturists are saved £100,000 in interest on every million advanced by co-operative societies compared with the charges of moneylenders. A still greater gain is the lesson of mutual confidence.

CHAPTER V

INDUSTRIAL AND ECONOMIC CONDITIONS

By J. S. Cotton

Introduction.

Agriculture, as has been seen in the preceding chapter, forms the predominant industry in India, to an extent that is hardly paralleled in any other country for which trustworthy statistics exist. It follows that the general economic condition of the people depends upon a staple industry, which is itself ever subject to the fluctuations of the monsoon rainfall. Naturally, therefore, attention has been turned to the possible development of other industries, in order to provide an additional and more stable means of subsistence, and at the same time to utilize more profitably the vast resources of the country in raw materials. It is with these other industries that the present section is concerned, but it must always be borne in mind that in the immediate future they can affect only a small fraction of the total population. A contented peasantry, freed so far as possible from the vicissitudes of the seasons, exporting their surplus crops and living in comfort on what they receive in exchange, presents a picture not less attractive to the social student than an aggregate of urban communities, with extremes of wealth and poverty, and dominated by the interests of capital.

Caste and trading classes.

From time immemorial India has known the principle of the division of labour, carried to excess in a development of the caste system. To a superficial observer the essence of the caste system may be represented by the sanctity of Brahmans, but for practical purposes it rests upon the hereditary nature of occupations. In every village more or less to the present day the smith, the potter, the leather-worker, and several other menials constitute recognized members of the community, whose business descends from father to son; and the same is

true of the more important trades, such as weaving, where the Muhammadans have formed a caste of their own. As a result, special aptitudes have been developed in the more highly organized castes, which show a delicacy of handiwork not inferior to the product of accurate machinery. So likewise in the business of buying and selling. No caste more closely resembles the guilds of mediaeval Europe than that which claims to represent the ancient Vaisya, though in primitive times the Vaisya were agriculturists, not traders. Under their Gujarat name of Wāniya, which has passed into English in the corrupt form of Banyan, they were the people with whom the factors at Surat first came into contact in the seventeenth century. Such as they were then described, so they are to this day—trained from childhood in all the maxims and artifices of trade, from petty shopkeeping to the largest speculative transactions. The Marwaris, a similar class, have spread from the deserts of Rajputana throughout northern India to the frontier of Assam, while the extreme south has its Chettis, whose operations extend to Burma and the Straits Settlements. The Muhammadans again have their own trading classes—notably the Bohras and Khojas in the west and the Labbais in the south—who are equally well organized. So far as trade is concerned, India has not much to learn from Europe.

Native commercial enterprise.

The Parsis, immigrants from Persia who had resided in Gujarat for several centuries before they applied themselves to commerce, were the pioneers of industrial enterprise on the basis of capital, under the protection of the East India Company at Bombay. Here they first showed their ingenuity by building ships of teak that found a place in the Royal Navy. As their wealth accumulated, they competed with English merchants in the foreign trade, especially with China; they took contracts for the construction of early railways; and they boldly opened cotton mills in rivalry with Lancashire. The trading classes of both Hindus and Muhammadans have since joined in the race, so that Bombay is now

a busy hive of capitalist industry, with smoking mill chimneys, banks, companies of many kinds, a stock exchange, a cotton mart, a mill-owners' association, and a chamber of commerce, all mainly under native control. The same picture, on a smaller scale, may be seen at Ahmadabad, the historic home of cotton-weaving in Gujarat, where the Jains, an unorthodox sect of Hindus, are prominent.

Elsewhere the application of indigenous capital to industry is less developed. At Calcutta the commercial houses are mostly English, and the jute mills are in English hands; but here, as well as throughout northern India, favourable signs are to be seen. One of the largest firms of contractors in Calcutta, though founded by Europeans, is now under the management of a Bengali Brahman. The recent *swādeshi* agitation, mainly political in its origin, while unsuccessful in its effort to establish large industries, has certainly improved the condition of hand-loom weavers. At Sialkot, in the Punjab, which has a wide reputation for sporting requisites, one native firm out of many employs a hundred men and boys under European foremen. The movement has extended to the more advanced native states. Mysore, as early as 1902, constructed an electric station on the Falls of the Cauvery to supply power to the mines in the Kolar goldfields, at a distance of nearly 100 miles. Kashmir has followed the example, on a smaller scale. Baroda encourages by subsidies a cotton mill, a bank, a tramway company, and other minor enterprises. Many of the railways in native states have been provided out of the surplus revenues of the rulers, who freely invest in government securities and also in the shares of Indian companies.

Protection.

It is but natural that Indian politicians should express dissatisfaction with the meagre results at present achieved in industrial enterprise. They complain that, in the interest of Lancashire, their cotton fabrics were first excluded from the English market and now suffer from unrestricted competition at home. They are not content with the exportation of raw materials as an indication of prosperity,

but rather regret that these are not profitably used up in the country. They quote the dictum of Mill that 'nascent industries' may be legitimately protected. They point to self-governing colonies which are allowed to impose a tariff even against the mother country. They point also to the analogous case of Japan, whose industrial development, fostered by the State, already threatens rivalry in their own markets. These complaints, when uttered by Indian representatives in the reformed legislative councils, cannot be ignored, especially when it is known that Anglo-Indian opinion, both official and commercial, largely sympathizes. As long as no fresh taxation is required, a final solution of the problem may possibly be postponed; but when the time comes it will test, as no other question has done, the altruism of English statesmanship.

State assistance.

Meanwhile, the government has not been negligent of palliatives. To safeguard the military position, factories have been established to make in the country not only clothing and saddlery but all kinds of munitions of war, excepting the heaviest guns. For the railways articles of local manufacture, such as wagon frames and bodies, are purchased so far as possible; and a contract has been made with the Tata Company for the supply of steel rails. Indeed, the rule is strictly enforced that all stores shall be obtained in the country whenever the quality is sufficiently good and the price not unfavourable. For example, official stationery is now almost entirely supplied by Indian paper mills. It has also been the practice of the government to institute special inquiries into those minor industries which, if better organized, seem to give promise of success, such as silk filatures in Bengal, sugar refining in the United Provinces, chrome tanning in Madras, and hand-loom weaving by improved methods everywhere. Industrial surveys have been carried out in several provinces. Technical institutes have been established, and scholarships are given for students to complete their practical training in the workshops of England.

Minerals: precious metals.

India has not been blessed with a bountiful supply of mineral products.[1] Of the precious metals, silver is known to exist in association with lead and zinc, but it has never been worked on a remunerative basis. The enormous store of silver in the country is entirely derived from importation, which has been continuous since the dawn of history. Gold, on the other hand, is an indi-

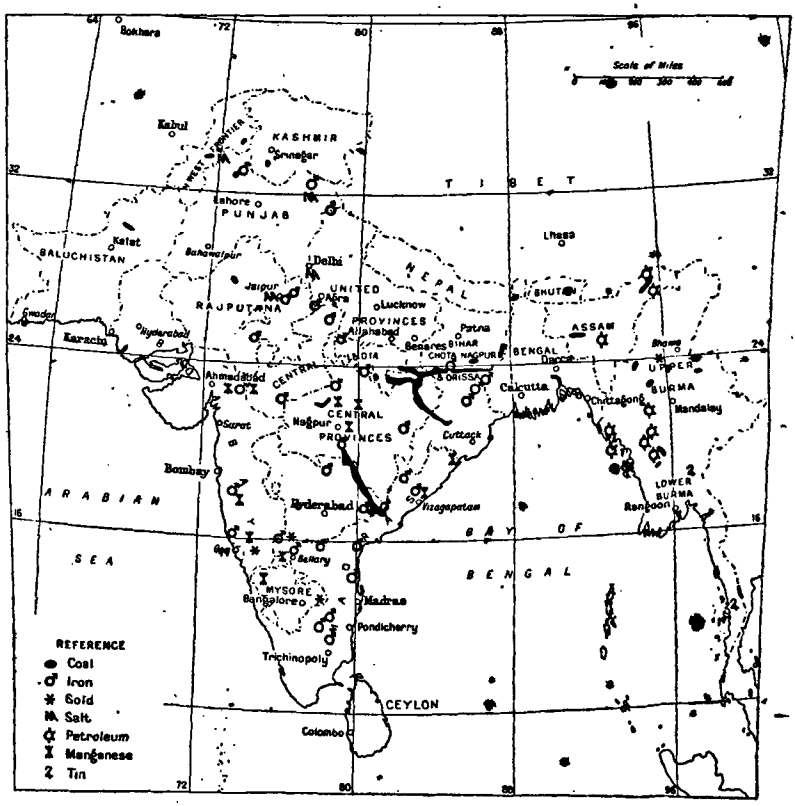

FIG. 8. Distribution of Economic Minerals in India.

genous product, though not on a large scale. Insignificant quantities are obtained by washing in many hill-streams, and dredging has been carried on in Burma in the upper course of the Irawadi. From time to time speculative interest has been aroused by the discovery

[1] [V. Ball, *Economic Geology of India*, 2nd ed., Calcutta, 1905; Sir T. H. Holland, *Sketch of the Mineral Resources of India*, Calcutta, 1908.]

of auriferous veins and evidence of old workings in widely scattered regions, usually resulting in disappointment and loss. The one conspicuous example of success is supplied by the quartz reefs of the Kolar goldfield in Mysore. Here operations began in 1880, and the annual output is maintained at the rate of nearly 600,000 tons of quartz, yielding an equal number of ounces of raw gold valued at £2,250,000, which is sent to England for refining. The total number of persons employed is about 30,000, and a very prosperous community has grown up. The only other mines now at work, also on quartz veins, are at Hutti, in the Nizam's dominions, which produces about 16,000 ounces a year; and in the Anantapur district of Madras, opened in 1910. In contrast with these figures, it may be mentioned that the total imports of sovereigns and gold bullion during 1912 amounted to more than £28,000,000.

Iron. Iron ores of rich quality are widely distributed over the country. In former times iron-smelting in little charcoal furnaces was a common industry. The steel thus produced, under the name of *wootz*, anticipated by many centuries the finest qualities of the modern European product. Indeed, the iron age in India, where there was never a bronze age, has been placed as early as 1500 B.C. But no local industry has suffered more from importation than that of iron-smelting. Apart from two capitalist enterprises, the total value of iron ore mined is estimated at only £15,000, while the annual imports of iron and steel exceed £4,000,000.

About 1830 energetic attempts were made to manufacture bar iron on a large scale near Porto Novo, in the south of Madras; but after a protracted trial the company was finally wound up in 1867. The failure was mainly due to scarcity of fuel, but technical difficulties were also experienced. A similar enterprise in Bengal, where clay-ironstone is found in proximity to coal, has been more successful, with the encouragement of orders from government; but the output does not exceed 60,000 tons. In 1907 a company was formed at Bombay, with a capital of more than £2,000,000, entirely raised in India, to

establish works for producing both iron and steel on the largest scale at a spot on the borders of the Central Provinces and Orissa, where iron ore, coal, and also manganese are accessible. Operations were begun in 1912 with two blast furnaces and steel-rolling mills, which are expected to turn out 7,000 tons of steel shapes per month, up to the British standard specification. Apart from the local demand, large orders have already been received from the Japanese government. It is interesting to learn that 'a much larger proportion of labour is in the hands of trained Indians than was anticipated'.

Copper and other metals.

Copper ore is likewise widely distributed over the country, especially in the north, but it is nowhere now worked profitably, whereas the importation of copper amounts to nearly £2,000,000. This metal has always been very largely in demand for domestic utensils; and its ancient use is attested by the discovery of a hoard of copper implements that must date from prehistoric times. There is no evidence that tin has ever been mined in India proper, though it does exist. The stanniferous deposits of the Malay Peninsula, however, extend into southern Burma, where cassiterite is washed by Chinese from the river gravels. The total production is valued at about £10,000, compared with an importation of more than £200,000. Lead is also found in Burma, chiefly in the northern Shan States, where lodes of the ore occur in association with silver and zinc. The output is about 35,000 tons, valued at £182,000 (including the silver), being somewhat higher than the value of lead imported. Another rare mineral which has recently attracted much attention is wolfram or tungsten, which occurs with the alluvial deposits of tin in southern Burma. In 1911 the output was valued at £100,000. Chromite is extracted in Baluchistan. Other metalliferous minerals known to occur are nickel, aluminium, cobalt, bauxite, graphite, and monazite.

Manganese.

More important than any of these is manganese ore[1],

[1] [L. Leigh Fermor, 'The Manganese-Ore Deposits of India,' in *Mem. Geol. Surv. India*, 1909.]

the mining of which began in the last decade of the nineteenth century, and has advanced so rapidly that India now ranks as the second country (after Russia) for the production of this substance, which is required for making certain high qualities of steel. It is widely distributed throughout the peninsular area, chiefly in the Central Provinces and Madras. The ores are exceedingly rich, and they are exported in bulk to be smelted abroad. The annual production has reached 900,000 tons; but in 1911–12 the exports were 536,000 tons, valued at £577,000. The number of manganese quarries worked in British territory alone is 41, employing more than 7,000 persons.

Coal.

From the economic point of view the most valuable mineral product of India is coal,[1] though unfortunately the coal is nowhere of a high grade. It occurs pretty widely, except in the south, but by far the most productive coalfields are those west of Calcutta, now divided between the two provinces of Bengal and Bihar. Coal was mined here more than a century ago, and transported by river. It is, however, only since the opening of railways that the industry began to attain large dimensions. The total output in 1911 was 12,700,000 tons, the value being estimated at £2,500,000. About 92 per cent. of the total is consumed in the country, about one-third on the railways alone. In 1911–12 the exports, entirely from Calcutta, amounted to 874,000 tons, valued at £514,000, mainly to Ceylon and the Straits Settlements, while the shipments of bunker coal on steamers represented an additional 935,000 tons. The business is liable to considerable fluctuations, caused partly by external conditions, but also by high local freights and deficiency of coal wagons. The railway companies which have their head-quarters at Bombay, far distant from any local source of supply, have recently contracted for coal from South Africa, while Westphalian coal is being bought by the cotton mills.

Mine administration and working.

In the great coalfield of Bengal the mineral rights vest in the *zamindārs*, or hereditary landowners. The

[1] [Wyndham Dunstan, *Coal Resources of India*, London, 1902.]

mines, so far as they have not been acquired by railways, are managed by companies with their head-quarters at Calcutta. Since 1901 they have been subject to an Act of the Indian legislature, which applies to operations carried on, whether in pits or underground, at a depth of more than 20 feet below the surface. All such operations are liable to examination by a duly qualified inspector, and provision is made for the appointment of local mining boards and committees to inquire into accidents or dangers the result of mismanagement. The almost universal mode of working is to extract the coal on the system which leaves the supporting pillars as long as possible untouched. This system, though undoubtedly wasteful, is justified by the strength of the overlying rocks; but it is now being gradually superseded by the more economical system of cutting away the pillars. Safety lamps are used in very few mines, on the ground that no appreciable quantities of fire-damp are found. This belief, however, was shaken by the occurrence of four explosions in 1910, resulting in twenty-seven deaths. Electric lighting, electric blasting, and electric machines for coal-cutting have recently been introduced.

Labour. The miners belong to different classes. The majority are from aboriginal tribes, such as the Santāls, Oraons, &c. Another large proportion is supplied by low-caste cultivators and labourers, such as Bauris, who have been employed for so many generations that they now regard mining as their caste occupation. More stalwart labourers come from the United Provinces. Labour is irregular, not only because the men wish to return periodically to their crops, but also because they decline to work definite shifts and insist on observing many holidays. The average annual output per person in Bengal does not exceed 100 tons. Underground work is usually undertaken by gangs of families at a fixed price per tub of coal. The coal-cutters are invariably men, but the women and children of a family carry the coal to the tubs, and push the tubs to the shaft or incline. The coal-cutters can earn from 8 to 12 pence a day for underground work,

while unskilled labourers on the surface earn only 3 to 4 pence. Women earn from 1 penny to 2 pence, so that the total earnings of a family have the effect of causing a general rise of labour rates round mining centres. In 1910 the daily average number of persons employed in coal mines in British India was 116,000, and the number of fatal accidents reported was 160. Mining education is given at the Sibpur College, near Calcutta, which was attended by 14 students in 1911, of whom 5 gained diplomas. Lectures are also delivered at several centres in the Bengal coalfield, attended by 325 students, of whom 18 qualified for certificates of competency as mine managers.

Mica.

The only other mining industry is that of mica, of which India produces more than half the world's supply. It is found in two tracts—in a belt of hilly country running through northern Bihar, and in the Nellore district of Madras. In both, mining is carried on by primitive methods under native management. Owing to the demand in connexion with the electrical industry for thin films, which were formerly a waste product, the output has largely increased, the value of the exports having risen from £88,000 in 1901–02 to £208,000 in 1911–12. The number of mines so called, which in Bihar really consist of tortuous holes sometimes extending to 300 feet below the surface, and in Nellore of open quarries, is 227, all under the Mines Act, employing 16,000 persons.

Petroleum.

The production of petroleum is almost confined to Burma, which now supplies the rest of India with more than half its total consumption of kerosene oil. The richest oil-yielding tract lies across the upper valley of the Irawadi. It had been worked by the natives certainly since the middle of the eighteenth century, but modern boring appliances were not adopted before 1889. Progress has since been very rapid. Drilling machines have been introduced, and the crude petroleum is now conveyed very long distances through pipes. One company alone employs over 7,000 persons, of whom about 150 are Europeans or Americans. A royalty of 8*d.* per

40 gallons is payable to the government. Refineries have been established near Rangoon, where the various constituents of the crude oil are put on the market in the form of kerosene, petrol, lubricating oil, fuel oil, candles, and paraffin wax. The total production rose from 10,000,000 gallons in 1893 to 83,000,000 gallons in 1903 and 222,000,000 gallons in 1911. The export of kerosene from Burma to the rest of India in 1911–12 amounted to 88,000,000 gallons, valued at £2,000,000, while a considerable trade has grown up in paraffin wax, candles, petrol, and benzine. The only other place where petroleum is profitably worked is at Makum, in the upper end of the Assam Valley. Here a company began work in 1900, and the output now amounts to about 3,560,000 gallons. The oil is a crude petroleum, rich in paraffin; the chief products are light naphthas, kerosene, and wax, of which the last is exported. The total exports of petroleum products in 1911–12 were valued at £442,000.

Salt and saltpetre.

Salt, with saltpetre, forms the most valuable mineral product of India after gold, coal, petroleum, and manganese. Apart from the salt produced by solar evaporation from sea-water, the two local sources of supply are mining in deposits of rock salt and evaporation of brine in lakes formed in areas of internal drainage. Rock salt is quarried in the north-west, mainly in the Mayo mine in the Salt Range in the Punjab, partly also at Kalabagh on the farther bank of the Indus and in the State of Mandi in the Himalayas. The total production is about 110,000 tons. The most important source from areas of internal drainage is the Sambhar Lake in Rajputana[1], from which nearly 5,500,000 tons have been derived since the government took a lease in 1870. The annual output, which varies according to the rainfall, amounts to about 140,000 tons. The question of the economic limits of this source are being carefully investigated. The total value of the salt produced in India, apart from duty, is about £350,000.

[1] [Sir T. H. Holland and W. A. K. Christie, 'The Origin of the Salt Deposits of Rajputana', in *Records Geol. Surv. India*, 1909.]

The chief source of saltpetre is Bihar, where the conditions are unrivalled for the natural production of the material. In former times, when gunpowder was the sole explosive and before the discovery of nitrates in Chile, the saltpetre of Bihar was in great though fluctuating demand; but the industry is now declining. In order to prevent the illicit production of salt, licences are issued for refining saltpetre and other saline substances. The total output of refined saltpetre in 1910 amounted to 14,000 tons, the whole of which was exported, at a valuation of about £214,000. Apart from a little borax, which comes from beyond the Himalayas, saltpetre is the only chemical exported from India, while the total imports of chemicals are valued at about £640,000. Mention may here be made of an enterprise started by an English firm who have taken up an area of the salt flats near Bombay, where they propose to manufacture chemical products on a large scale, some of which will be utilized in the cotton mills while others will meet the demand for a cheap artificial manure.

Gems.

Precious stones and gems, including pearls, have been absorbed in India, like gold and silver, from time immemorial, rather than produced. The diamond mines, of which so much was once heard in three distinct localities, are now practically forgotten. The ruby mines in Upper Burma have proved disappointing to the English company which has worked them since 1889. The production averages about 300,000 carats, including small quantities of sapphires and spinels, valued at about £70,000. Of almost equal value in the same region is jadeite, greatly in demand in China, which was exported in 1911 to the value of £30,000. Among other precious stones are—agate and cornelian, the preparation and cutting of which has long been a staple industry of Cambay; garnets, found in Rajputana; and beryl, which came from southern India in Roman times. No estimate can be formed of the production; but the total imports of precious stones and pearls are valued—and no doubt undervalued—at £600,000.

Building stones.

Though large areas exist, as in eastern Bengal, where not even a pebble is to be seen for hundreds of square miles, India as a whole is rich in building stones of excellent quality, which have been utilized in architecture from early times. In the south enormous temples, profusely covered with carving, are mainly built of granite, rivalling similar structures in ancient Egypt. Most of the famous Mogul forts, palaces, mosques, and tombs are of sandstone; but the material of the Tāj is white marble, with elaborate inlay of malachite, cornelian, jasper, &c. At Bombay the modern buildings are of limestone from Porbandar on the coast of Kathiawar. Improved means of transport have recently increased the demand for Indian material, especially at Calcutta, which now obtains sandstone from Mirzapur far up the Ganges, and freestone and trap from the western coast, while the Victoria Memorial Hall is decorated with fine marbles from Rajputana. Similarly, granite from the picturesque tors round Hyderabad in the Deccan is carried 500 miles by rail for the Bombay harbour works. Lime and cement, largely required for the brilliant stucco known as *chunam*, are derived from many sources. Even where limestone does not occur, the soft calcareous substance called *kankar* can be dug up from the alluvial soil. As early as the eighteenth century lime was quarried on the southern face of the Khasi Hills in Assam, then beyond the British frontier, for transport to Calcutta; and these quarries are still profitably worked. In 1913 a company was formed, with Indian capital but with expert English advice, to utilize the waste of the Porbandar quarries for manufacturing Portland cement. Slate is largely quarried along the outer Himalaya in the Punjab, where a joint stock company has proved a financial success; and also in some other parts of the country. Steatite or potstone is very widely distributed, and is utilized for making dishes and carved objects.

Potter's clay.

There are few parts of India in which clay is not found suitable for bricks, tiles, and common pottery. The finer materials, such as china-clay, fire-clay, felspar, &c.,

are not common ; but an enterprise for the development of these, with Indian capital and under European supervision, promises to be successful at Katni, in the Central Provinces.

Among handicrafts, the weaving of cotton, as the chief material everywhere for the dress of the people, holds a predominant place. Cotton is more universally grown than any other crop—from Tinnevelly to the Punjab, from Sind to Cocanada, and also in the hills on the north-east frontier. Before transport became easy, it was necessary that such a bulky commodity should be produced on the spot and equally necessary that it should be worked up locally. The cotton-weaver, therefore, is to be found in almost every large village, though the finer fabrics are made only in large towns or special localities, which again are distributed over all parts of the country, and not concentrated as in Lancashire. The hand-loom weavers are for the most part males, as used to be the case in England, except in Assam and Burma where weaving is a domestic industry of the women. There are special castes of weavers, both Hindu and Muhammadan, by whom all the finer fabrics in special localities are made; but coarse weaving is a subsidiary occupation of landless labourers in many parts.

Handicrafts: cotton-weaving.

It may be doubted whether the hand-loom industry has suffered so severely from English competition as is sometimes alleged. Granted that the weavers are not prosperous, and also that their numbers are decreasing, have hand-loom weavers ever been a flourishing class in any country? Granted that they suffer in case of drought, when the demand for their products suddenly ceases and they possess no savings to fall back upon; but it is on record that in former times they were the first to perish wholesale by famine. Where the industry is most highly organized, it has always been based upon a system of advances, by which the actual producer of valuable fabrics is kept in a condition approaching penury. A striking example of this system, which applies also to other industries, is presented at Srinagar

Economic position of hand-loom industry.

in Kashmir, where exceptional expertness meets with little reward.

Co-operation; training of workers; improvement of methods.

The improvement of the hand-loom industry has recently received a good deal of attention. Perhaps the chief hope for the future lies in the adoption of the co-operative principle, which is steadily growing in the case of agriculture; for the real difficulty lies not so much in defective implements as in the permanently embarrassed condition of the workers. A start has been made by the Conjeeveram Weavers' Union in Madras, originally financed from outside, which lends to its members for the purchase of yarn and assists the sale of the finished product. There are now ten of these weaving co-operative societies in Bombay, where the government has announced its intention to establish a central store for the supply of yarn at wholesale rates and to give information about the trend of markets. Weaving schools, with trained experts and special kinds of looms, have likewise been opened at old centres of the industry, notably at Salem in Madras, Serampore in Bengal, Bara Banki in Oudh, and Ludhiana in the Punjab—the last by the Salvation Army, with government assistance. Much also has been done to popularize improved looms and other labour-saving appliances, such as the fly-shuttle, a very simple contrivance which is claimed to double the output and to weave very fine counts of yarn. Finally, the *swādeshi* agitation has undoubtedly had some effect in stimulating a demand for the better class of hand-woven fabrics, and in thus raising both the price and the rate of wages.[1]

One significant change that has taken place in connexion

[1] The Collector of the Hooghly district in Bengal, in which Serampore is situated, reported in 1907: 'It appears that, while formerly the weavers had to take advances from the middlemen, and were always more or less indebted to the latter, they are now very much better off, and, if anything, the middlemen are sometimes indebted to them. I was told the other day . . . that a young widow of the weaver caste, who would formerly in all probability have suffered great privation, was now earning Rs. 16 or Rs. 17 (over £1) a month, and maintaining herself and her younger brother and sister in some comfort. In Daniākhāli I was told that a weaver earns about Rs. 20 a month, and the subdivisional officer at Serampore reports that a weaver there earns Rs. 25 a month.'

with hand-loom weaving is the general supersession of hand-spun by machine-spun yarn; and it is no less significant that the machine-spun yarn is derived in increasing proportion from the local mills. Here we have a telling example of the disappearance of a domestic industry accompanied with no loss, but rather with benefit to all concerned.

Centres for fine fabrics.

While village hand-looms provide the coarse cloth which the poor prefer as lasting longer than mill-made goods, the finer fabrics are produced at special centres, often of historic interest, such as Dacca, Benares, Burhanpur, and Rajahmundry. In northern India these finer fabrics take the form of muslins and damasks, usually with a pattern or border of coloured silk or gold thread. In the south calicoes and chintzes predominate, either printed from blocks or painted by hand. It was these last that attracted the early European traders. If the external demand has fallen away, they still represent an important industry; for the best dresses of the well-to-do, male as well as female, are woven on hand-looms to the present day. According to the trade returns, the total export of dyed and printed cotton goods amounts to about £900,000, mostly from Madras to the Straits Settlements and Ceylon.

Silk-weaving.

Hardly to be separated from the weaving of cotton is the weaving of silk, which is less affected by either foreign imports or competition from the mills. Unlike cotton, silk is not an indigenous product. Though several species of wild and semi-domesticated worms are found, and have long been utilized, in the forests of Central India and Assam, the true silkworm is of recent introduction and is almost confined to Bengal, where the mulberry is also cultivated. Even here, however, the industry is not very flourishing, in spite of government support. The reeling of silk is carried on in filatures, under both European and native management, and thread is twisted from the reeled silk by women. Raw silk and woven silk are exported, but the imports of both considerably exceed the exports. Sericulture on scientific methods is an

established industry in the State of Mysore; and it has recently been introduced into Kashmir, with remarkable success, but the silk produced there is almost entirely disposed of in the European market.

Sources of material and distribution of industry.

The raw silk used in India is mainly derived from China and received at Bombay. This represents an old course of trade, for Gujarat is the centre of silk-weaving and Gujarati silk-weavers are found in many remote parts of the country. Silk is a luxury, which lends itself to artistic treatment. Nothing can exceed the richness of the brocades, or the delicacy of colour in the scarves and turbans that are woven in Indian looms. Gold is interwoven with the silk, as in the kincobs of Benares, and silk forms the bordering pattern of the finest cotton tissues. The industry is naturally more centralized than that of cotton, and also more largely under the control of capitalists. It is estimated to give employment to no less than 12,000 persons (mostly Muhammadans) at Benares, where a silk-weavers' association has recently been formed, and to 7,000 persons at Amritsar in the Punjab, which owes its importance partly to the immigration of shawl-weavers from Kashmir. The industry demands capital, for the raw material is expensive and the finished product often has to find a distant market. It is, therefore, comparatively well organized and not unremunerative. But the actual worker, though highly skilled, reaps little of the profits. He is indeed said to be more closely under the thumb of his employer than any other class of artisan.

In Burma silk garments are worn more generally than in India proper. The local industry, said to have been introduced by captives from Manipur, is concentrated in the upper valley of the Irawadi, round the old capital of Mandalay, and is mainly carried on by women. The fabrics are sober in hue and durable, but the demand has suffered severely in recent years from the competition of more gaudy and cheaper goods from Europe and Japan. In 1901, the total number of persons in Burma supported by silk-weaving was 34,000, of whom actual workers numbered 6,000 males and 18,000 females.

Dyeing is an industry closely associated with cotton and silk. Though a special caste of dyers, known as *Rangrez*, exists, the work is commonly carried on by the weavers themselves, particularly in southern India. The country abounds in natural dyes, of which it is sufficient to mention indigo, lac, safflower, and turmeric. These provide the delicate colours which appeal to the popular taste, and show up so brilliantly and yet so harmoniously in an Indian crowd. But since the end of the last century the importation of aniline dyes from Germany has come with a rush, with the result that the use of natural dyes and the skill of the workers in preparing them have greatly declined. The industry is now specialized in factories, large or small, for different processes are required in the case of cotton, silk, and wool. Mention may be made of a successful enterprise at Madura, in the extreme south, started by some educated young men, with support from weaving firms, to produce mainly from local vegetable products a dye that simulates 'Turkey red'. In 1911–12 the imports of aniline and alizarine dyes were valued at £614,000. Dyeing.

Wool has never been an important industry in India, partly because the climate does not require warm clothing, but also because the wool of the country sheep resembles hair rather than wool, especially in the south. Nevertheless, this wool is universally made up into coarse blankets by the shepherds themselves, who both spin and weave. Wool is also felted for horse-cloths and floor-rugs. The Punjab is the only province where the industry is conducted on a considerable scale, and here the best material needs to be imported from Tibet and the Himalayan subhills, from Afghanistan and Persia, and from Rajputana, which last produces the only good wool in the plains of India. The more valuable fabrics consist of two classes: shawls or *chadars*, and carpets. The former are made of *pashm*, which is properly the under-coat of Tibetan goats, but now often adulterated. The shawl industry of Kashmir is almost extinct, having been destroyed partly by failure of demand in France, and Woollen goods.

also by famine which drove the weavers into exile in the Punjab. Here they still make a few shawls of fine quality at Amritsar and Nurpur, chiefly for the Indian aristocracy. What are known as Rampur *chadars* are made at Ludhiana and Amritsar, largely for wear in Bengal. These industries are conducted by capitalists, on a system of advances to the actual workers. The same is true of carpet-weaving, likewise concentrated at Amritsar, which sends its products to England and America. The total export, however, of carpets in 1911–12 amounted to only £165,000. Carpets are also made in jails, particularly at Agra, Mirzapur, and Gwalior ; and it is claimed that this, instead of injuring private enterprise, has rather encouraged it by stimulating the demand and improving the patterns used. An interesting development of the *swādeshi* movement has recently taken place in the Punjab, where woollen yarn, locally known as *raffal*, is imported mainly from Germany, to be made up at hand-looms into cheap flannels and tweeds. *Pattu*, from which word the now familiar 'puttee' is derived, is a rough cloth made as a domestic industry by the hill-folk of Kangra. The hair of camels is clipped, but is little utilized except for making ropes and sacking. Goats' hair is applied to the same purposes.

Em-broidery.

Brief mention may be made of several kinds of embroidery or needlework, carried on generally by women, which are of artistic rather than economic importance, though some of them have been developed for export. It is a peculiarity of all Indian needlework that the needle is pulled away from, not drawn towards, the worker. Darn-stitch is employed on coarse cotton, and chain-stitch on silk or woollen fabrics. *Phūlkāri*, or 'flowered' work, consisting of silk embroidery on *chadars* or veils, is characteristic of Jat women in the Punjab. *Chikan* work, which denotes a form of minute satin-stitch with drawn threads, is a special occupation of *purdah* women at old Muhammadan capitals, such as Dacca and Lucknow. Lace, introduced by missionaries into girls' schools, has become popular in the south. The embroidery of table

centres, &c., with washing silk has recently become a profitable industry in Kashmir. The silk and gold embroideries of Delhi and Agra are articles of luxury still in demand, while Kathiawar is noted for the needlework of its peasant women.

Tanning. The skinning of dead animals and the tanning of leather do not form a pleasant occupation. Consequently they are confined to the very lowest and most despised class of Hindus, while the wholesale trade in hides, of great value and importance, is carried on by Muhammadans. The village tanner, usually called *Chamār* throughout northern India, *Mahār* in the Deccan, and *Mādiga* in Madras, has a recognized position in the community, and sometimes even a plot of land. The skins of cattle that die a natural death form his perquisite, in return for which he has to provide the leathern necessaries for agriculture and also the bucket used for drawing water from the well for irrigation. Drinking water, on the other hand, is drawn up by each person's own vessel. It is noticeable that this caste seems to be increasing fast, and steadily diverging to ordinary agricultural labour. Somewhat higher in the social scale is the *Mochi* or shoemaker, who may be an urban artisan and is often a Muhammadan. The country supplies almost everywhere materials for tanning in abundance, but the processes followed are crude in the extreme, and (except at Cawnpore and Madras) the industry is of little importance. Three large factories at Cawnpore, employing more than 5,000 hands under English management, produce leather of excellent quality, which not only provides military requirements, but boots and shoes for export to the Straits Settlements and South Africa. In Madras the skins of sheep and goats and the hides of cattle are cured for export, and chrome tanning has been introduced with some measure of success. These cured skins and hides go from Madras mainly to England to the value of about £3,000,000, while raw hides and skins, to the value of about £6,000,000, are sent mostly from Calcutta, the largest proportion being taken by the United States.

Several attempts have recently been made in the Punjab to manufacture leather of the Cawnpore quality, by Hindus as well as Muhammadans. A company at Rawalpindi, starting with hand labour, set up in 1911 modern machinery for both bark and chrome tanning, as well as boot-making and leather-work generally. The manager was brought from Madras and factory hands from Cawnpore, but the local Chamārs are said to be proving apt pupils. Decorated leather-work is an indigenous industry, chiefly in northern India, the material often being deer-skin, used for military and sporting requisites. The co-operative movement has extended to tanners and shoe-makers in Bombay and also in Bengal; and more may be expected in this direction, for the urban Chamārs are in their own way a clannish and well-organized body. In Calcutta there is a colony of expert Chinese shoe-makers.

Pottery.

The manufacture of pottery is another universal village industry, though the *Kumhār* or potter does not rank high in the social scale. Religious prejudice among Hindus will not permit an earthen vessel to be used twice for food, so that the potter's products mainly consist of storage jars, domestic utensils for Muhammadans, pots for the Persian wheels where irrigation is carried on by that method, and tiles. On the other hand, the potter is not strictly confined to his caste occupation, but can do odd jobs and use his donkey for carrying to market the grain and other produce of his fellow villagers. Superior qualities of unglazed pottery of many kinds are made at some places, such as the thin jugs and cups known as *kāghazi* ('paper-like'); vessels ornamented with fruits and flowers in relief, which are impressed in moulds and affixed before baking; black pottery painted with red; gilt painted pottery, and yellow and red ware. The manufacture of toys of clay is widely spread, and the terra-cotta statuettes of Lucknow possess not a little artistic merit. Glazed pottery is of two kinds, both of which are localized in a few places in northern India, and both are believed to be of Muhammadan origin. One kind

consists of the glazing of vessels for domestic use or ornament, as at Peshawar, Gujranwala, and Khurja. The other is the enamel work of Multan and Sind, originally on tiles for architectural decoration, but now applied also to bowls, vases, &c. This industry is said to be prosperous.

In Burma all cooking is done in earthen vessels, which are made everywhere, but the potter's trade is not so specialized as in India proper. Martaban jars, once famous throughout the East for carrying liquids in bulk, are now forgotten, though the name survives for the glaze associated with them.

Returns under the Factory Act show fourteen factories using mechanical power for making pottery and tiles, and employing 5,000 persons. The most important is that which has been worked by an English company at Raniganj, in Bengal, since 1869. Glazed drain-pipes, bricks, tiles, and every kind of pottery are made here, to the annual value of more than £20,000. A flourishing manufacture of tiles has been established by the Basel Mission at Mangalore, on the west coast, whence the product is largely exported to Bombay.

Metal working.

The blacksmith or *Lohār* is another village menial, to be found everywhere, whose duty it is to provide and repair the primitive ploughshare, hoe, sickle, &c., required by the cultivators. His own apparatus is of the simplest, but he is not unskilful. This is shown by the readiness with which he can adapt himself to the making of more elaborate articles, such as cutlery and locks. These special industries tend to be centralized in towns. Monghyr, in Bihar, has for more than a century been famous for the manufacture of cheap but serviceable firearms. At many places in the Punjab, where the workers are all Muhammadans, a thriving business has recently sprung up in the manufacture of cutlery, locks, safes, trunks, and dispatch boxes, which are in great demand. One firm at Sialkot even turns out surgical instruments of excellent quality, while the enamelling of iron ware has recently been started.

Iron-smelting works.

Only two works exist for the smelting of iron ore after modern methods. The oldest of these is at Barakar, in the neighbourhood of the Bengal coalfields. Started in 1874, it has passed through vicissitudes, despite government patronage; and the production of steel has been abandoned. The annual output of pig is about 50,000 tons, valued at £270,000, from which about 15,000 tons of castings are made at a foundry adjoining the blast furnaces; and the number of operatives employed is about 3,000. For the great enterprise of the Tata Iron and Steel Company at Sakchi, on the border of Orissa and the Central Provinces, no statistics are yet available, for regular working only commenced in October, 1912. It must be sufficient to say that, in addition to producing foundry pig and basic pig, it is hoped that the output of steel will reach 7,000 tons a month. The total imports of iron and steel in 1911–12 amounted to 684,000 tons, valued at nearly £8,000,000, of which 60 per cent. came from the United Kingdom. The largest items are galvanized sheets, bars (mostly from Germany and Belgium), and sheets and plates.

The number of iron and brass foundries (including engineering workshops) is over 80, mostly in Bengal and Bombay, employing 25,000 operatives. Among the articles very generally turned out are roller mills for pressing sugar-cane. There are also, under State management, 16 railway workshops, 3 canal foundries and engineering workshops, and 17 military arsenals and factories.

Copper and brass working.

The worker in copper and brass, known as *Kasera* or *Thathera*, is not so much a village menial as an independent artisan. The industry is universal, for both Hindus and Muhammadans require their vessel for liquids to be made of one or other of these metals. The Hindu demands brass, in the graceful form of the globular *lota*, while the Muhammadan prefers copper and insists that his *tonti* shall have a spout. The industry is fairly prosperous, for there is no foreign competition and the material of worn-out vessels can be used up again; but, on the other hand, the actual workers, though paid by piece-work, are

often bound hand and foot to the middleman. Apart from domestic vessels, there is a large business in the making of utensils for ceremonial use in Hindu temples, images of deities and of animals. Ornamental copper and brass work forms a speciality at many large towns, such as Benares, Delhi, Poona, and Jaipur. In Burma images of Buddha of a stupendous size are cast in brass, and bells and gongs are also made; but the people do not eat off metal. The manufacture of domestic utensils from aluminium, started by government, seems to have established itself at Madras. The total imports of copper in 1911–12, which showed a considerable decline on the preceding year, amounted to 554,000 cwts., valued at nearly £2,000,000.

Gold and silver working.

The worker in gold and silver, known as *Sonār*, is to be found even in villages, though the industry is specialized in large cities. The growing imports of bullion, together with the fall in the price of silver, may have increased the quantity of the output; but the trade is said to be not very profitable, and the *Sonār* does not occupy a high social position. The regular mode of remuneration is that the worker should return the stipulated weight of metal, and receive for his labour so many annas to the *tola*, according to the style of the workmanship.

Scarcely less important than the manufacture of gold and silver plate is the production of gold and silver wire for brocades and embroidery. It is said that not long ago as many as 100,000 persons were employed at Delhi in the different branches of this industry, which has suffered from the importation of inferior ready-made materials. Enamelling on gold reaches its highest perfection at Jaipur, in Rajputana. The business of the lapidary is of minor importance, jade, agate, rock-crystal, garnet, and turquoise being the stones chiefly used.

Factory industries.

Among the factory industries of India, cotton and jute stand pre-eminent, and for them accurate statistics are available. Both are the creation of the last sixty years, based upon Western methods, and both show continuous growth.

Cotton.

After the several food-crops, cotton is the most important of India's agricultural products. The annual production may be put at 4,000,000 bales (of 400 lbs.), or about one-fourth of the American crop, the great bulk being of short staple but of easy growth. Almost the whole of it is now ginned and pressed by machinery, the number of cotton presses exceeding 1,000 and employing during the season more than 100,000 hands. Of the total crop about one-half is exported, mostly to Japan and the continent of Europe, the amount taken by Lancashire being insignificant. The other half is used in the country, the proportion taken by the mills being estimated at three-fourths, for hand-spinning, though decaying, is not everywhere an extinct industry. The mills spin for three purposes: to supply their own looms and also the hand-looms, and for export. Of the total internal consumption of yarn, no less than 92 per cent. is provided by the Indian mills. The exportation of yarn, mainly to China, is not increasing, and consequently a larger proportion is being consumed in the country. On the whole, the spinning industry is less prosperous than the weaving, though this is not due to foreign competition, for the net imports of yarn remain stationary, while the number of spindles in Indian mills has increased during the past five years by 13 per cent. The Indian mills enjoy a monopoly of the coarser counts of yarn, and are extending their production of medium counts by means of long-stapled cotton from Egypt and America.

The weaving industry in Indian mills shows steady and remarkable progress. During 1908–12 the number of looms increased by 29 per cent., while the production of cloth increased by no less than 41 per cent., the average monthly production per loom having risen from 236 to 258 lb. Of the total production, about 10 per cent. is exported, entirely to other oriental countries. Putting aside hand-woven cloth, for which no statistics are available, and comparing the imports of grey or unbleached goods with which alone the production of Indian mills comes into competition, it may be said that the local

output is rapidly gaining ground and will shortly equal the stationary amount of imports. It is only in white and coloured goods that the imports are increasing, though in these also the Indian mills, especially in Madras, are augmenting their proportion of finer fabrics. Taking all classes together, the local mill production in 1911–12 was equal in weight to just one-third of the total imports.

In 1912 the number of cotton mills in all India, including native states and Pondicherry, was 258, of which more than half were both spinning and weaving mills, while 103 were exclusively spinning and 19 exclusively weaving. No less than 170 mills are in the Bombay Presidency, containing 70 per cent. of the total number of spindles and 78 per cent. of the total number of looms. Bombay city alone has 84 mills and Ahmadabad 54. The rest are widely scattered over the country, from Madras to the Punjab. They are almost entirely owned by companies, of which both shareholders and directors are Indians; but the practical mill manager usually comes from Lancashire. The joint stock capital exceeds £15,000,000, and the number of hands employed is about 237,000. The industry is, of course, subject to vicissitudes, caused by external rather than internal circumstances. But its general prosperity is attested by the wealth of Bombay, where the shares of some companies are quoted on the Stock Exchange at a premium of 300 and 400 per cent. The quotations of fifty companies taken at the end of March in each of the four years 1909–12 ranged from 4 to 18 above par. The labour supply is mostly drawn from the neighbouring coast of Konkan, and the men have a habit of returning to their villages for a month or so when required for agriculture. A more permanent source is derived from the Julāhās, a caste of Muhammadan weavers, who come from as far as Northern India. The operatives live, under not very sanitary conditions, in *chauls* or large lodging-houses. An association, called the Kāmgār Hitwardak Sabhā, has been formed to look after their interests. A company, with about two crores of rupee capital (£1,333,000), is constructing hydraulic works

on the edge of the Ghats for the supply of electrical power to the cotton mills of Bombay, which ought to be in operation by 1914. In two large Madras mills a scheme of profit-sharing has recently been introduced with success.

Jute.

The jute industry presses close upon that of cotton. Indeed, if the export of manufactured goods be alone considered, jute distinctly takes the lead. India has a practical monopoly of the plant that yields the fibre, and that monopoly is confined to eastern Bengal, with Calcutta as the exporting and manufacturing centre. The annual production of jute may be put at about 9,000,000 bales (of 400 lbs.), or more than double the annual production of cotton. Of the total, nearly half is exported, mostly to the United Kingdom and the continent of Europe, while almost all the rest is taken by the mills, the proportion used for domestic purposes being now insignificant. Jute, like cotton, requires to be pressed before transport. The number of jute presses is about 115, employing about 30,000 persons during the season. In the case of jute, no distinction arises between spinning and weaving mills, for the yarn is only spun in order to be woven in the looms. The total number of mills is 60, all in the immediate neighbourhood of Calcutta, but mostly on the opposite bank of the Hooghly, employing more than 200,000 hands. During 1907–12 the number of spindles increased by 34 per cent. and the number of looms by 40 per cent. The production is divided almost equally between two classes—bags and Hessian cloth. The former are used solely for packing grain, wool, &c., the latter also for the manufacture of linoleum. The exports, representing more than two-thirds of the total production, mainly go to the United States, Australasia, and South America; but it is noteworthy that the United Kingdom takes of both classes to the value of £800,000, in addition to 7,000,000 cwts. of raw jute. The jute mills are almost entirely owned by companies with British shareholders. The total capital exceeds £10,000,000, of which about one-third is sterling capital. The industry is liable to fluctuations,

even more than that of cotton, partly owing to the price of the raw material, which during 1911–12 rose by one-third above the average of the previous five years. But, on the whole, its prosperity is firmly established, for jute is the cheapest of all known fibres. A large portion of the labour-supply is drawn from Bihar and the United Provinces, since the work in jute mills demands physical exertion beyond the strength of the local population. For the same reason, too, the workers are very independent, sometimes striking without apparent cause, and demanding three months' holiday during the hot season.

Wool.

Other factory industries may be briefly mentioned. There are only 5 woollen mills in all India, with 30,000 spindles and 770 looms, producing goods valued at about £340,000. Clothing is woven for the army and police, while for superior articles Australian wool is largely used. Perhaps the most successful is one in the Punjab, which employs about 1,000 hands, and turns out high-class hosiery as well as woollen cloth. The company has built a model village for its employees, and has also started a co-operative credit society. It has the advantage of water-power from a canal.

Paper.

The number of paper mills at work is 8, with an output valued at £540,000. The official supply of foolscap, blotting-paper, note-paper, and envelopes is now mostly obtained from this source; but the imports of cheap wood-pulp paper have increased faster than the local production. In 1911–12 the imports of paper and pasteboard were valued at £785,000.

Flour.

Flour mills number 32, employing over 3,000 persons. They are most numerous in the wheat-growing Punjab, but the largest are to be found at the seaports. In recent years the exportation of wheat-flour, mostly to other oriental countries, has developed. In 1911–12 the exports amounted to 52,000 tons, valued at £531,000.

Rice and timber.

Rice mills and saw mills are almost confined to Burma, where both are worked on a large scale for the export trade under European management. The former employ about 20,000, and the latter about 10,000 persons.

Sugar refining.

According to the returns for 1910, there were in all India only 21 sugar factories, employing 5,400 persons. Of these, a very few are old-established and prosperous refineries, under European management, deriving a proportion of their profits from the production of rum. India is the home of the sugar-cane, but the local production almost universally takes the form of a crude brown stuff, known as *gur* or *jāgri*. On the other hand, the importation of refined white sugar, mostly from Java, has increased enormously, so that it is now estimated to form more than 20 per cent. of the total sugar supply. Naturally, therefore, strenuous efforts have been made, especially in Northern India where the cane is most widely grown, to establish local refineries, and government has gone so far as to guarantee financial support. Perhaps the most hopeful undertakings are in Bihar and the United Provinces, where English capital has been compelled to abandon indigo. In 1911 there were 8 refineries in the United Provinces, of which 3 were owned by companies with European directors, 2 by companies with Indian directors, and 3 by Indian firms.

Oil-crushing.

Another industry with promise for the future is that of oil-crushing by machinery. The village *Teli*, with his wooden oil-press worked by bullocks, is still commonly to be seen, though his business has suffered severely from the competition of cheap kerosene, while the exportation of oil-seeds of all sorts is steadily growing, until in 1911–12 it reached a total value of £18,000,000. The utilization of some portion at least of this raw material on the spot, for the production not only of oil but also of by-products such as cattle-food, manure, &c., has recently attracted attention. Cotton-seed appears to offer the most profitable opening. Government has subsidized a cotton-oil factory at Cawnpore, to which a refinery is attached, while Indian capitalists have set up imported machinery for crushing decorticated cotton-seed at Akola in Berar and near Bombay.

Factory legislation.

The first Act for the regulation of factories was passed in 1881, amended in 1891, and again in 1911. It now

applies to all establishments employing 50 hands or over, and may be extended to establishments employing only 20 hands. In 1911 the total number of factories liable to inspection was 2,248, employing 792,000 persons, of whom 115,000 were women and 48,000 children. In textile factories, which are by far the most important, the rules regarding sanitation and the fencing of machinery are generally well observed, the chief difficulty being experienced in certifying the age of children, fixed at 9 years. The following are the chief provisions of the latest Act, which came into force on July 1, 1912. No person shall be actually employed for more than 12 hours, no woman for more than 11 hours, and no child for more than 6 hours in any one day; no person shall be employed before 5.30 a.m. or after 7 p.m.; the period for which mechanical or electric power is used shall not in any one day exceed 12 hours. Still more recently a committee has been appointed to consider the ventilation of cotton mills in Bombay.

Joint-stock companies.

In 1912 the number of registered joint-stock companies at work in British India was 2,463, with a paid-up share capital of £46,250,000, and £6,000,000 in debentures. During 1903–12 the increase in paid-up capital was 75 per cent., while in the same period the amount invested in coal-mining in Bengal has multiplied fourfold. More than three-fourths of all the companies are found in the two provinces of Bengal and Bombay. The business of the companies may be thus classified in order of importance: mills and presses, trading and shipping (including railways and tramways), mining and quarrying, banking and insurance. In addition, it is estimated that 373 companies registered elsewhere carry on work in India, with a total capital of £123,000,000. But by far the greater part of this is represented by railways, the only other business of importance conducted by sterling capital being tea-planting. In 1913 a new Companies Act was passed, in order to bring the law into harmony with that of England, and also to secure more careful auditing.

Transport: Railways.

The story of economic development in India is almost

identical with that of railway extension. Invaluable as the railways are for military purposes and also in time of famine, it is their daily use for the transport of commodities that has revealed to India the true value of its products. Despite its great rivers, the country is not well provided with the means of water carriage. Throughout the Peninsula proper not a single river is navigable for any distance. Even in the north both the Ganges and the Indus have ceased to be utilized to any extent since a railway traversed their valleys. It is only in the delta of Bengal, and along the Brahmaputra and the Irawadi, that steamers and native boats still conduct a large business. The value of roads, which form a network over the whole country, is now mainly as feeders to the railways, permitting wheeled carts to be substituted for pack-bullocks. Apart from goods traffic, the influence of railways in the conveyance of passengers can hardly be over-estimated. It is by this means, as much as by the spread of the English language among the educated classes, that Indians are attaining to a sense of unity and the possibility of common action.

Company and State ownership.

Railway construction began in 1853, on lines laid down by Lord Dalhousie, who had previously been responsible for legislation affecting railways in England. The task of making trunk lines across the country was entrusted to companies, with a guarantee of interest and an option to the State to purchase the lines at a fixed date. All the railways then authorized have now become the property of the State, though most of them are worked by successors of the original companies. As these early lines were for long unremunerative, the burden of the guarantee became oppressive; and in 1869 the State resolved to construct future lines with capital borrowed directly by itself. Since that date various other methods have been adopted from time to time to attract capital for the construction of new railways. Certain native states have contributed among them more than £15,000,000. At the present time encouragement is given to companies with rupee capital raised in India to construct feeder lines by the grant of favourable

terms for the interchange of traffic. The State, however, is directly responsible for at least three-quarters of the railways, and has to provide every year, either directly or by guarantee, about £10,000,000 for their improvement and extension. Fortunately, the railways, which till 1898–9 had annually proved a loss to the State, have since turned the corner and may now be regarded as a highly remunerative source of revenue. In 1912–13, which was not an exceptional year, the net earnings amounted to no less than £15,616,000, being a return of 5·89 per cent. on all the capital at charge.

Railway workers and workshops.

The total number of persons employed on railways is about 563,000, of whom only about 17,000 are Europeans or Anglo-Indians, mostly guards and engine-drivers on passenger trains, or occupying responsible positions in the workshops. The total number of railway workshops is 59, employing 73,000 persons. No railway at present undertakes to build its engines and wagons complete from start to finish; the parts come out from England and are only put together in India. The imports of railway material of all kinds, mostly rolling stock, average about £5,000,000. In recent years, however, the companies have begun to construct for themselves, while the State also has adopted the rule of purchasing articles of local manufacture as far as possible. A test-house has been opened, with the object of conducting mechanical and chemical tests of metals, cement, &c.; and a laboratory has been erected for testing the steel rails made by the Tata Company.

Ports.

India has not been favoured by nature with good harbours. The only estuaries navigable by ocean-going steamers are those leading to Calcutta, Rangoon, and Chittagong. Except at Bombay, nothing better than a roadstead is to be found round both coasts of the Peninsula, where vessels often have to lie miles away from the shore. Seaborne trade is therefore concentrated at a few places, to which the railways converge. Calcutta, despite the treacherous channel of the Hooghly, stands first with 37 per cent. of the total trade. Bombay, with the advantage

of facing the west, comes second with 33 per cent. Then follow close together Karachi, Rangoon, and the Madras ports, each with about 10 per cent. The five chief ports are each managed by a port trust, with large powers of administration, under government control. Bombay alone has extensive docks, which are being enlarged, partly by land reclamation. At Calcutta the principal works are wharves and jetties for the several branches of the export business. The Karachi harbour is a modern creation, continually improved to keep pace with the growth of trade. The open roadstead at Madras has at last been converted by sheltering arms into a place where steamers can lie in comparative safety. At Rangoon the chief difficulty is in training the river channel.

Shipping. Before the opening of the Suez Canal the foreign trade of India was mainly conducted by sailing vessels, which have been superseded by steamers, ever increasing in number and size. In 1911–12 the total number of steamers that entered and cleared at all Indian ports was 6,424, with an aggregate burden of 16,409,000 tons and an average of 2,554 tons. In addition, there were about 3,000 sailing vessels, almost entirely native craft engaged in trade with other oriental countries, and these averaged only 87 tons. The tonnage under the British flag, including the Indian register, is about 79 per cent. of the whole; and the entries from and the clearances to the United Kingdom and British possessions form about 56 per cent. of the whole, both these proportions tending to decrease. Among foreign countries the order of vessels under the principal flags is: Germany, Austria, Hungary, Norway, Japan, Italy, France.

Trade. Though the people of India generally have a passion for buying and selling, as may be seen in any *bāzār* or fair, trade is highly specialized in certain classes, who form a chain extending from the village shopkeeper to the wealthy banker. Secular Brahmans do not despise trade; Rajas have been known thus to utilize their hoarded revenues; among Muhammadans are to be found travelling pedlars and also dealers in leather and

in horses. But the Hindu, who under different local names everywhere claims to belong to the Vaisya caste, is the representative trader both retail and wholesale. In the village his ostensible function is to purchase grain and sell cloth, for among an agricultural community these are the two commodities that require the intervention of a middleman. His real business, however, is by no means so strictly limited. He is the one man not directly dependent upon the annual harvest; the one man with a calculating head and a saving disposition; the one man who has cash at his disposal. Consequently, he is likewise the village moneylender, to whom all resort when seed is wanted, when instalments of rent or revenue fall due, and when the expenses of a wedding have to be defrayed. He is naturally not a popular character. Indeed, from a distance he looks like a grasping extortioner; but when viewed as part of the rural economy, it may be doubted whether he does not perform a necessary, if unlovable part. In some provinces legislation has been introduced to protect the cultivator and the landowner from the consequences of their own recklessness and extravagance. A more permanent safeguard may possibly be found in the extension of the co-operative credit system, in which the possessor of small capital has an appropriate and useful place.

The native trader.

The same man, risen to a higher sphere, conducts the operations of wholesale trade in the towns and at the railway stations, which have become busy centres. Here also grain and cloth, with the addition of salt, spices, and sugar, are the principal commodities, for food-grains of many kinds are exchanged from one part of the country to another on an astonishingly large scale. This is, of course, a result of the extension of railways, which has tended to equalize prices, not only in seasons of local scarcity, but at all times. Two features of wholesale trade are worthy of notice. One is the extent to which all transactions are carried on through the intervention of brokers, a custom which is of very old standing in India, where fractional commissions are dear to every class of the people. It

Wholesale trade.

should, however, be stated that the independent wheat-growers in the canal colonies of the Punjab are beginning to deal directly with purchasers. The other feature is a passion for speculation, in the form of *sattās*, or options, which may have the effect of steadying prices, but often degenerates into mere gambling, especially among the Mārwāris. The trade for export, even in up-country markets, is largely in the hands of a few European firms, who make their purchases through brokers; and the business of shipping at the ports is almost entirely conducted by European firms, to whom the Indian traders consign their purchases by rail. The import trade also is mainly in European hands.

Cotton trade and general business.

The general course of business may be illustrated by the example of the cotton-growing district of Amraoti in Berar. The railway returns show an annual export of nearly £2,000,000, of which about four-fifths is raw cotton, while the next largest heading is yarn and piece-goods manufactured at the local mills. The imports average less than £1,500,000, the three largest items of almost equal value being cotton manufactures, food-grains, and liquors, followed by sugar and metals. The surprising place occupied by liquors (nearly £500,000) must be attributed to the high rate of wages earned during the cotton season by common labourers, not less than 8*d.* per day; and in one year the consumption was estimated at 12*s.* per head of the male population. The imports of cotton manufactures are nearly threefold the value of the exports. Besides the cotton mills, there are about 100 steam factories for the ginning and pressing of cotton throughout the district, owned by persons of various classes, who derive part of their profit by making advances on the crop. Of three European firms doing business, one has agencies at six centres, and all employ brokers.

Foreign commerce: Exports.

For foreign commerce accurate statistics are available, showing an enormous growth in recent years. Comparing the figures for 1911–12 with the average for the ten years ending 1901–02, exports have more than doubled, while imports have almost doubled. In 1911–12 the

total exports of Indian merchandise (excluding re-exports of foreign merchandise and also treasure) were valued at nearly £148,000,000, showing an increase of 8 per cent. on the previous year. According to the classification adopted, raw materials and unmanufactured articles formed about 45 per cent. of the total, the principal items being cotton, oil-seeds, jute, and hides and skins. Manufactures formed about 16 per cent. of the total, jute goods considerably exceeding cotton goods, followed by dressed or tanned hides and skins, and lac. Articles of food and drink formed about 31 per cent. of the total, their increase on the previous year being no less than 25 per cent. If rice, wheat, and other grains be added together, their total value amounted to no less than £34,000,000, indicating the large surplus of food which the country can produce in a favourable year. A notable feature was the fourfold increase in food-grains other than rice and wheat, chiefly gram, barley, and maize. The only other important item in this class is tea. The heading of chemicals, drugs, &c., consists almost entirely of opium, the trade in which is being gradually extinguished.

Turning to the imports, merchandise (again excluding treasure) was valued in 1911–12 at more than £92,000,000, showing an increase of 7 per cent. on the previous year. Here manufactures formed no less than 55 per cent. of the total, by far the largest item being cotton goods and yarn, followed by apparel and woollen manufactures. Metals and manufactures thereof come next, forming 19 per cent. of the total, the principal items being iron and steel, railway materials, machinery and mill work, hardware and cutlery, and copper. Articles of food and drink form more than 14 per cent. of the total, sugar being by far the largest item, followed by provisions, liquors, and spices. The trade in sugar is of such a character as to merit detailed notice. About 1890–95 the exports and imports of sugar approximately balanced each other. The exports have now dwindled to insignificance, while the imports have risen from little more

Imports.

than 1,000,000 cwts. to 12,000,000 cwts. This extraordinary increase was at the beginning attributed to the unfair competition of bounty-fed beet sugar from the continent of Europe; but when this was checked by countervailing customs duties, refined cane sugar produced in the central factories of Java rapidly took its place, followed at a distance by imports from Mauritius. The truth is that the people of India have developed a taste for white sugar, which is not at present made in local refineries, and are able to pay for what they want. It is estimated that during 1903–12 the total consumption of sugar increased from 1·96 lb. to 6·79 lb. per head of population, while the proportion that is imported rose from 6 to 20 per cent. The analysis of other items under this general head is also of interest, as showing the consumption of luxuries. Among provisions, the largest items (each exceeding £200,000 and all advancing) are dates, canned and bottled provisions, farinaceous foods, biscuits, and preserved milk. Under liquors, the imports of beer are about equal to the outturn of the local breweries, though neither of the two is increasing, while the imports of spirits of all sorts is less than one-sixth of the total issued from local distilleries. It is surprising to find that the imports of spices considerably exceed the exports, but this is entirely accounted for by the large receipt of betel-nuts from the Straits Settlements.

Treasure.

The absorption of bullion by India on the balance of trade has attracted notice since the time of the Roman Empire. A new feature of quite recent growth is the decline in the demand for silver and the great increase in the demand for gold. During 1908–12 the net imports of silver (on private and government accounts combined) fell steadily from £13,000,000 to £3,500,000, while the absorption of gold (deducting local production and re-exports) rose almost as steadily from £13,500,000 to more than £27,000,000. In the calendar year 1912, the importation of sovereigns alone amounted to £20,000,000, nearly double that of the previous year. Whether these sovereigns are being hoarded or have passed into circula-

tion is immaterial to the evidence they afford of the growing prosperity of the country.

Principal trading countries

The United Kingdom naturally stands first among the countries with which India trades, though its share of the exports is much smaller than its share of the imports. In 1911–12, the imports from the United Kingdom were nearly £80,000,000, or 63 per cent. of the total, towards which cotton goods alone contributed £33,000,000. Java, with its enormous shipments of sugar, stands second with £6,000,000, closely followed by Germany. Then come the United States, Japan, the Straits Settlements, Austria-Hungary, China, Belgium, France, Mauritius, and Italy. As regards exports, the share of the United Kingdom was only £42,000,000, or 26 per cent. of the total, for the raw materials which India so largely produces are in demand in all quarters of the globe. Here Germany stands second with £15,000,000, followed by China, Japan, the United States, France, and Belgium.

Re-exports.

Re-exports represent little more than 3 per cent. of the total of imported merchandise, and this entrepôt business is not a growing feature of the foreign trade. It principally consists of English coloured cotton goods redistributed among neighbouring countries to the value of more than £1,000,000; next in importance is raw wool, received by sea and re-exported from Karachi. In 1911–12, the total re-exports were valued at £4,000,000, exceptionally swollen by the re-exportation of Java sugar to the amount of more than £1,500,000.

Coasting trade.

Coasting trade is conducted on an active scale, reaching the large total of £40,000,000. The chief items are rice and mineral oil from Burma, cotton goods from Bombay, and coal and jute bags from Bengal.

Land frontier trade.

The total trade by land across the northern frontiers of India, so far as registered, shows an increase from £9,500,000 to nearly £13,000,000 during 1907–1912. By far the largest business is done with Nepal, which sends agricultural products to the value of nearly £3,000,000, and receives in return cotton goods, metals, oils, spices, sugar, salt, &c., to the value of £1,500,000.

It is notable that Nepal could spare rice amounting to nearly £1,000,000, and also raw jute to the value of £165,000, and *ghī* (clarified butter) to the value of £221,000. Next in importance is the trade with the northern and southern Shan States, which are strictly part of British Burma. This amounts to more than £2,250,000, almost equally divided between exports and imports. The trade with Afghanistan amounts to about £1,500,000, Kandahar contributing considerably more than Kabul. In the case of Kabul, the imports to India, consisting mainly of fruits and nuts, are less than one-third in value of the exports from India; while the imports from Kandahar, largely wool, exceed the exports. In both cases, and indeed in all the frontier trade, the most important export is cotton goods, and those of English, not Indian, manufacture. Trade with the border principalities of Dir, Swat, and Bajaur shows satisfactory increase, now amounting to nearly £1,000,000. Trade with Tibet amounts to little more than £250,000, the principal import being wool.

Currency.[1] A sound currency system, a steady rate of foreign exchange, and adequate facilities for credit are all necessary for industrial prosperity. As recently as 1893 it cannot be said that any of these conditions was established in India. It was in 1893, when the exchange value of the rupee had steadily fallen from the par of 2*s.* to nearly one-half, that the Indian mints were closed to the free coinage of silver. At the same time it was announced that sovereigns would be exchanged for rupees at the rate of fifteen rupees to the sovereign or 1*s.* 4*d.* for the rupee, and that sovereigns would similarly be received in payment of sums due to government. The effects of this measure were slow in operation; but by 1899 the exchange had at last risen to 1*s.* 4*d.*, and a further step towards establishing a gold standard was then taken by which sovereigns were made legal tender at that rate. Except for a financial crisis in 1908–9, when the normal state of things was reversed, the steadiness of exchange has since given no cause for anxiety. This result, however, has

[1] [L. C. Probyn, *Indian Coinage and Currency*, London, 1897.]

been achieved only by the support of a gold standard reserve, formed out of the profits of silver coinage, which already amounts to £22,000,000, and is intended ultimately to include £25,000,000 in sterling assets, of which £5,000,000 will be in gold coin. In addition, the government holds more than £28,000,000 in gold or gold securities in the paper currency reserve.

The currency of India therefore consists of a silver coinage, securely based upon a gold standard. The amount of silver in circulation at any time depends upon the trade demand, which is estimated by the government according to the stock in the treasury and the reserves. After November 1907, no coinage was undertaken until 1912, when no less than £7,000,000 of silver was purchased, which was coined into 15¾ crores of rupees, passing on a profit of about £3,000,000 into the gold standard reserve. But while the currency is silver, gold is likewise a legal tender, and the recent large importation of sovereigns, due to commercial prosperity, has caused gold to circulate, especially in some parts of the country, to a considerable extent. During 1911–12 (calendar years), sovereigns were received to the amount of no less than £30,000,000, while the net absorption of gold bullion was only £12,000,000. The question of a gold currency for India was mooted when the mints were first closed to free silver, and the desire has been growing in certain quarters, partly out of patriotic sentiment. Difficulties have been raised in England from the point of view of the Mint, but these it is proposed to get over by coining a gold ten-rupee piece, which would be the exact equivalent of the old English mark, money of account (not a coin) for 13*s.* 4*d.* The whole question, with others of a financial nature, has been referred to a Royal Commission.

Note issue.

The issue of notes, or a paper currency, has been a monopoly of government since 1862, when it was withdrawn from the presidency banks. Notes are issued in several denominations, from Rs. 5 up to Rs. 10,000, from seven currency circles, having their head-quarters at

Calcutta, Cawnpore, Lahore, Bombay, Karachi, Madras, and Rangoon. The larger notes are payable only within the circle of issue, but since 1911 the smaller notes (up to Rs. 100) have been made legal tender everywhere, thus greatly extending their use as a means of remittance. In fact, they have largely taken the place of the *hundi*, or native bill of exchange. The total value of notes in circulation has almost doubled within the last ten years. In June, 1913, it amounted to 66 crores of rupees, or 44 millions sterling. Solvency is guaranteed by the full value of the notes being held in the paper currency reserve, of which only a fixed proportion may be invested in Indian or British government securities, the remainder being in gold or silver.

Banks.

There is no single government bank in India with a status corresponding to that of the Bank of England, though the establishment of such an institution has more than once been seriously considered. Its place is taken, to some extent, by the three presidency banks of Bengal, Bombay, and Madras, whose constitution and business are regulated by statute. The government undertakes to keep a minimum balance with them, and they manage the public debt; but they are restricted from dealing in foreign exchange or otherwise employing their capital out of India. As a matter of fact, the government is itself by far the greatest banker in the country, not only through its monopoly of note issue, but also by reason of the large cash balances which it is required to keep in the treasury of every district head-quarters. The desirability of making these balances available for assisting trade is one of the questions to come before the Royal Commission. Next in importance are what are called the exchange banks, twelve in number, whose head offices are outside India, and whose business is mainly confined to trade transactions at the seaports. In addition, there are about eight local banks under European management. The number of joint-stock companies registered in 1912 as engaged in banking or loan operations was 491, but the majority of these are money-lenders with a very small

capital. If insurance be added, the total amount of share capital paid up does not much exceed £5,000,000. It should, however, be stated that several banks, with rupee capital and under Indian management, have been founded at Bombay, which do business on an ambitious scale. One of them subscribed for the greater part of the government loan in 1912, while another, with a government guarantee for its debentures, has the special function of assisting co-operative credit societies.

Financial activity.

Indeed, the most notable feature in the economic history of India is the extent to which she is growing independent of outside capital. Whereas all the railways were originally financed from England, the only State railway loan for 1913 was raised in India, and the rupee shares of no less than eight minor railways are quoted on the Bombay Stock Exchange, all paying fair dividends. While the sterling securities of the Government of India have fallen proportionately with Consols, the rupee loans, increasingly held in India, stand almost unchanged. Apart from cotton and jute mills and coal mines, the large debts of the presidency municipalities and the port trusts have been almost entirely raised in the country, at the low rate of 4 per cent. Within recent years a Parsi firm has successfully promoted two companies, each with a capital of nearly £2,000,000, to start enterprises which English financiers declined. If the total capital of joint-stock companies appears small, amounting in 1912 to £46,250,000 in shares and £6,000,000 in debentures, there is abundant evidence to show that the wealth acquired by agriculture, manufacture, and commerce is not being hoarded or wasted in luxury, but devoted more and more to profitable uses.

Biblio-graphy.

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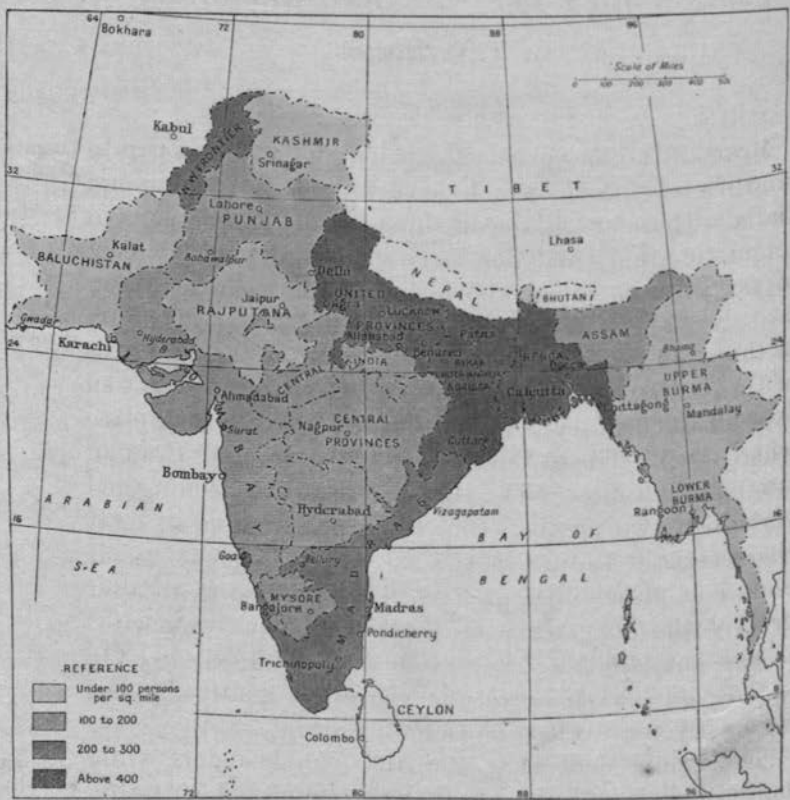

FIG. 9
Distribution of population in India.

CHAPTER VI

LANGUAGES, CUSTOMS, AND RELIGIONS

By T. C. Hodson

Languages

Modern Indian vernaculars belong for the most part to families of speech which have representatives beyond India. There are, however, three small widely separated linguistic groups and one large important family which, so far as philological knowledge extends, cannot safely be correlated with any other linguistic stock. The first of these languages is Burushaski, spoken in the wild hills of Hunza Nagar on the North-West Frontier, once spoken over all the country north of the Hindu Kush, at a place where Turki, Tibeto-Burman, Indo-Aryan, and Eranian languages all meet. The language has a fully conjugated verb with two numbers and three persons, and its most characteristic feature is the extremely frequent use it makes of pronominal prefixes, sometimes so as to alter greatly the appearance of the word. Thus 'my wife' is *aus* but 'thy wife' is *gus*; 'to make him' is *etas*; 'to make you' is *mamaritas* if you are a gentleman but *matas* if you are a lady (*I. C. R.*, i, p. 346).

Linguistic groups and families.

Burushaski.

The twelve dialects of the Andaman Islanders, while mutually unintelligible, are obviously connected generally. They exhibit the expression only of the simplest and most direct thought, and invariably experience difficulty in getting out of the region of concrete into that of abstract thought. They make full use of clever mimicry. Specific terms are numerous and extremely detailed. All objects, and every idea associated with them, are regarded as connected with themselves and their necessities, or with the parts of their bodies and their attributes. In these languages words fulfil their functions by an external development effected by affixes, and express modifications

Andaman Islands.

of their original meanings by a similar internal development. The position and form of the component words of sentences complete the meaning. The use of prefixes and of suffixes is about equally developed, while that of infixes is rudimentary. The use of prefixes as numeral coefficients or generic determinatives is strongly marked. Simple they are not, but their regularity is well marked.

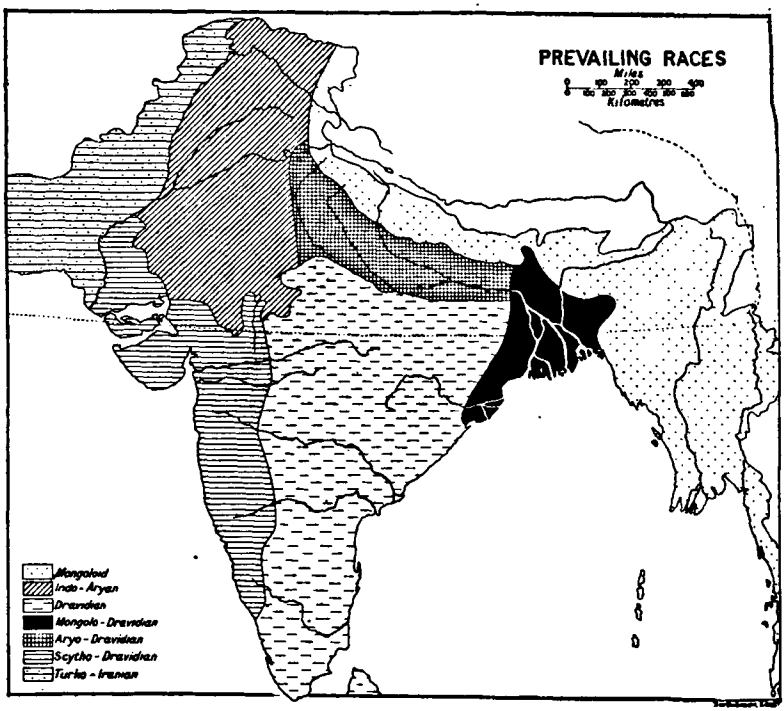

FIG. 10

Mawken. The language of the Salons, or more correctly the Mawken, is spoken by the sea gipsies of the Mergui Archipelago, and has adopted many words of Malay origin in the simplest possible form. It has lost all vestiges of Malayan word-formation, if it ever had any.

Dravidian languages: distribution. The Dravidian languages form an independent family of speech, and occupy the whole of Southern India and the northern half of Ceylon. Their northern frontier may be taken to begin at a point on the Arabian Sea

about a hundred miles below Goa, and to follow the Western Ghats to Kolhapur. It then runs north-east in an irregular line through Hyderabad, cuts off the southern border of Berar and continues eastward to the Bay of Bengal. The eastern part of the frontier is not anything like a continuous line. Broadly speaking, the hill country to the east of Chanda and Bhandara is inhabited by

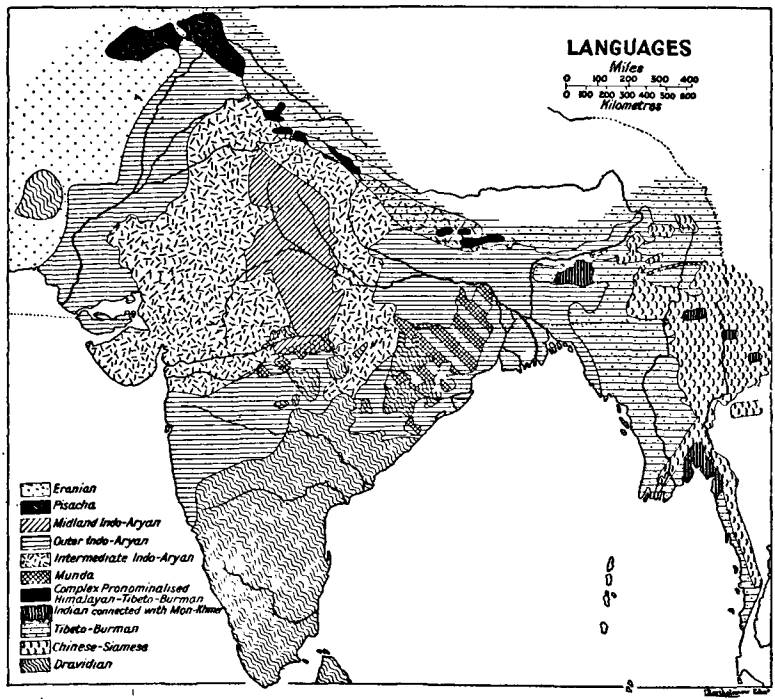

FIG. 11

Dravidian-speaking tribes, while Aryan dialects have occupied the plains so that Dravidian dialects are often scattered like islets in the sea of Aryan tongues. Farther to the north Dravidian dialects are spoken by small tribes in the Central Provinces and Chota Nagpur, and even up to the banks of the Ganges at Rajmahal. Finally, there is a Dravidian dialect in the far north-west in Baluchistan.

Tamil is usually selected as the unit of comparison and

classification, as it has preserved most traces of the original form of speech and has developed the common Dravidian principles most faithfully. Malayalam has developed a separate literature. Kanarese is closely related to Tamil. Tulu, Koḍagu, Toda, and Kota lie between Tamil and Kanarese but nearer the latter. Kurukh and Malto are derived from the dialect which originated Tamil and Kanarese. Possibly Kui and Gondi, with minor dialects such as Kolami and Naiki and Bhili of Basim, are also derived from this archetype, but they have been considerably influenced by Telugu, which, as the sole representative of the Andhra language of early grammarians, occupies in many respects an independent position. Brahui must have branched off at an early date when dialectical differences had not become as great as they now are. Tamil is spoken all over the south-eastern part of the Peninsula and in the northern half of Ceylon, in Travancore on the western side of the Ghats from Cape Comorin to about Trivandrum. The Tamils are an enterprising race and are found outside India as well as in parts of India other than their home.

Malayalam is spoken all along the western coast from Kasargodu in the north to Trivandrum. Its eastern frontier is the Western Ghats and that on the west the Arabian Sea. It is spoken in South Kanara, in Malabar, in Cochin, and in parts of Mysore and the Nilgiris and in Travancore.

Kanarese is the principal language of Mysore and the districts of Coimbatore, Salem, Anantapur, and Bellary, of part of the Satara area of the Bombay Presidency and almost up to Kolhapur. It is the official language of North Kanara and the principal language of South Kanara.

Tulu is spoken in Kanara. Koḍagu has its home in the district of Coorg on the Western Ghats. Toda is the speech of the singular people whose main habitat is in the Nilgiri Hills. They possess a secret as well as a sacred language.

Kurukh, the language of the people to whom the name Uraon is generally given, is spoken in the western por-

tion of the Bengal Presidency as it was, now the Behar and Orissa lieutenant-governorship, and in the adjoining parts of the Central Provinces. Its proper home is the Chota Nagpur plateau.

Malto is almost exclusively spoken in the Rajmahal Hills district of Bhagalpur.

Kui is the speech of the people known as the Khonds, who live in the hills of North Madras, and extend into Orissa and the Central Provinces.

Gondi is the principal Dravidian language of North India, and is spoken in the plateau of the Central Provinces from Wardha in the west and south to Balaghat and Mandla in the east and north. It is spoken in the northern parts of Madras, even in Hyderabad, but its linguistic boundaries are peculiarly ill-defined.

Kolami, which is considered as the remnants of a form of speech which has not been involved in the general development of the principal Dravidian tongues, or as the speech of a group which did not originally belong to the Dravidian stock, is the language of an aboriginal tribe in eastern Berar and the Wardha District of the Central Provinces.

Naiki, now practically obsolete, was spoken in Chanda. It is used as a synonym of Banjari, and in the Bombay Presidency it connotes a Bhil dialect.

Telugu is the principal language of the eastern part of the Peninsula from Madras to Bengal.

Brahui is spoken in the mountainous regions of Eastern Baluchistan and the neighbouring districts of Sind.

With the exception of Brahui, then, the Dravidian languages are spoken over a well-marked area; they were once spoken over a much larger area, and, although the general tendency is for them to be displaced by Aryan dialects, they are holding their own in Southern India. Here and there they have ousted dialects of Munda origin, but there have been some losses to the Mundas. It is deemed possible that in Marathi-speaking households the younger generation, which is now more familiar with Kanarese than with the mother tongue, may grow up to

substitute a Dravidian for an Aryan form of speech (*Mysore Census R.*, 1911). Brahui is slowly giving way to Balochi and to Jatki (*Baluchistan C. R.*, 1911, p. 131).

Dravidian languages: characteristics.

The Dravidian languages generally possess well-marked characteristics. In phonetics there are tendencies (i) to pronounce a short vowel after every final consonant, (ii) to approach the sound of vowels in consecutive syllables, (iii) to begin no word with a soft consonant while requiring that every medial consonant shall be soft. The nouns are divided into two classes, high-caste nouns and casteless nouns: in the former all nouns denoting beings endowed with reason, while in the latter class all other nouns. In the case of high-caste nouns, gender, which is also shown by affixing words meaning male and female, is shown by the use of pronominal suffixes, a linguistic device found elsewhere, in Daghestan and in languages of the Caucasus, in certain Sudan dialects and in some Nilotic dialects. Dravidian nouns have only two numbers, and form their cases by adding postpositions, identical in both numbers, either to the simple base or to an oblique base. The genitive of ordinary nouns is in reality an adjective. Both classes of words are often used in the verbs.

Higher numerals are formed on a decimal system. Malto alone uses generic determinatives. The personal pronouns, especially the reflexive form, are often used with words denoting relationship. To contact with Munda languages is ascribed the use of a double plural, one inclusive, the other exclusive. From Indo-Aryan sources come many loan-words. Tamil, Malayalam, Kanarese, and Telugu have all developed literatures, in each case in a form of the language which differs widely from that used in current speech. The earliest record preserved to us is contained in a Greek play in a papyrus of the second century A.D. Jain influence has been considerable in the early days both of Tamil and Kanarese literature. Sanskrit influences came later, and have contributed largely to the development of Dravidian literatures, both in vocabulary and in choice of subject. The characters used are all ultimately derived from the Brahmi script.

The families of speech represented in as well as beyond India are (i) the Austro-Asiatic, (ii) the Indo-Chinese, (iii) the Indo-European, (iv) Semitic, (v) Hamitic. The last two are spoken by casual immigrants or by persons whose home is outside India, and are not Indian vernaculars in any real sense. Speech families represented in and outside India.

The Austro-Asiatic family of languages is widely diffused. It covers a tract reaching from the Punjab in the west to Easter Island off the coast of South America on the east, from the Himalayas in the north to New Zealand in the south. In India the members of this group are (i) the languages of the Munda group, (ii) Khasi, (iii) the Nicobarese dialects, (iv) the Mon-Khmer languages, divided into three sub-groups, Talaing or Mon, the Palaung-Wa, and the Miao-Yao. Austro-Asiatic.

The Munda languages comprise Santali, Mundari, Bhumij, Birhar, Koda, Ho, Turi, Asuri, and Korwa in one group; Kurku, Kharia, Juang, Savara, and Gadaba in a second. The last two have been subject to Dravidian influence, while contact with Aryan forms of speech has left decided traces on the first three languages of the second group. To the first group the name Kherwari has been given, and it embraces all those Munda tongues which use *har* or some cognate form for man. The most important language is Santali, spoken over a strip of country extending for about 300 miles from the Ganges in the north to the Baitarani in the south, in the following districts: Bhagalpur, Monghyr, Birbhum, Midnapore, Morbhanj, Balasore, Keonjhar, Dalbhum, Manbhum, the Sonthal Parganas, Hazaribagh, Murshidabad, Twenty-Four Parganas, Dinajpur, Malda, Rajshahi, Bogra and Rangpur. Distant hills and remote jungles are the favourite haunt of these people. The Mundas are mainly to be found in the south and west of the Ranchi district, and scattered over Palamau, Hazaribagh, Singbhum, Chota Nagpur Tributary States, in Bamra and Sambalpur districts of the Central Provinces. The Bhumij mainly live in the Orissa Tributary States in Singbhum and Midnapore. Birhar is spoken by little over a thousand people in all in Munda languages.

Hazaribagh, Ranchi, and Singbhum. Koda is the speech of a vagrant folk whose linguistic boundaries cannot be easily or accurately stated. The main habitat of the Hos is Singbhum, where they are known as the Larka or fighting Kols. Turi is spoken in Ranchi, and in Sambalpur. Asuri is spoken in Ranchi and Jashpur. The Korwas are found in various parts of Chota Nagpur and in Mirzapur district of the United Provinces. The home of the Kurkus is in the Satpura and Mahadeo Hills, into Berar, in Amraoti, and Akola. The stronghold of the Kharia language is the south-western corner of Ranchi and the adjoining portions of Jashpur and Gangpur. The Juangs are found in the Dhenkanal and Keonjhar States in Orissa. The Savaras inhabit the two northernmost districts of Madras and the adjoining districts of Bengal and the Central Provinces, and their language is mainly spoken in the hilly tracts of Ganjam and Vizagapatam. The Gadabas are found everywhere in Vizagapatam and the Ganjam Agency, a few living in Bastar and in Kalahandi.

The Munda languages possess a richly developed phonetic system with traces of the law of harmonic sequence. Their stock of words to denote individual things is rich and varied, but they are poor in abstract and general terms. Nouns denoting relationship almost always take a pronominal suffix. Gender is shown either by different words or by adding words meaning male or female. Nouns are of two classes, those that denote animate beings and those that denote inanimate objects. There are three numbers, singular, dual, and plural. The personal pronouns in the dual and plural have two forms, inclusive and exclusive, or selective and collective. The higher numbers are counted in scores. The verbal formation, if apparently complicated, is regular. Indirect and direct objects are denoted by pronominal infixes inserted between the inflexional base and the categorical base *a*, which asserts the reality of the action. There are separate forms for active, passive, and middle voices. The Munda languages were once spoken over a much wider area. To

their influence are ascribed peculiarities of certain Himalayan dialects of the Tibeto-Burma family, and they have had a potent effect on the moulding of the Mon-Khmer languages, and especially Talaing, into the forms they finally assumed. Slight traces of Munda influence can also be found in some Bhil dialects.

Khasi, which has several dialects, is spoken in the Khasi and Jaintia Hills of Assam. It possesses a complete system of gender indicated by prefixes. It has a relative pronoun, and is capable of forming abstracts. Its numeral system is decimal. There are tones. Its speakers are increasing steadily. Khasi.

Near the sea coast, on both sides of the mouth of the Salween River, the Talaing or Mon language is struggling for existence. Its vitality is great, and it is holding its own against Burmese. It is rich in vowel sounds. Its roots are for the most part distinctly monosyllables. The distinction of gender is applied to things which have animate life, and even of these only a few may be said to belong inherently to either gender. Number is vaguely expressed, and, as in Burmese, generic determinatives are freely used.

The Palaung dialect is spoken in the Northern Shan States and in the Mong-Mit State of the Ruby Mines District of Upper Burma. Yin or Riang is spoken by a Palaung tribe which has extended south into the Southern Shan States. The Was, with their sub-tribes the En and the Pyin, live in the eastern portions of the Shan States. The tone system in Wa is well developed. Gender is denoted either by different words or by suffixes or by prefixes. It has three numbers in the personal pronouns, and maintains the inclusive and exclusive plurals in the first person. There is here the same tendency to coin different words, and generic determinatives seem to be used as suffixes with numerals. The numeral system is decimal.

The Miao Yao languages are scattered over South-Western China. A few villages on the eastern border of the Northern and Southern Shan States contain all the

representatives to be found in Burma. Their kinship with Mon-Khmer is proved by a comparison of vocabularies and by a number of structural resemblances.

Talaing possesses a literature written in a character derived from Pali and influenced by Burmese ideas and methods. Khasi too has both script and literary activities, which it owes to the energy and enterprise of the Welsh Calvinistic Mission.

Nicobar Islands.

The six dialects of the Nicobar Islands are mutually unintelligible, though related. The chief peculiarity of these languages lies in a series of suffixes of direction. Numeral coefficients or generic determinatives are used very thoroughly, eighteen classes being known definitely. The numeral system is vigesimal, and the methods of reckoning are most interesting.

Indo-Chinese family.

The Indo-Chinese family divides into two main groups, the Tibeto-Burman and the Siamese-Chinese. The classification of the Tibeto-Burman dialects follows their actual geographical dispersion, as groupings on any set philological principle have not yielded satisfactory results. No less than ten main groups can be distinguished—(i) Tibetan, (ii) Himalayan, (iii) North Assam, (iv) Bodo, (v) Naga, (vi) Kachin, (vii) Kuki-Chin, (viii) Burma, (ix) Lolo, and (x) Kachin-Burma hybrids. Each of these groups is further subdivided into minor but not the less important subdivisions, each of which is characterized by points of difference from the central principles. The tone system, due to the detrition and absorption of prefixes and suffixes and to other consonantal and vowel modifications, is well but irregularly developed here. The Tibetan group stretches from Baltistan to Szechuan. The Himalayan group comprises two divisions, the complex pronominalized dialects spoken in Almora, Kanawar, Kangra, Chamba, and Lahul, and the non-pronominalized dialects spoken in the Central Himalayas in Sikkim and in the valley of Nepal. It is of peculiar importance, as its salient characteristics (the incorporation of pronominal affixes to denote the object, the retention of a double plural and of a vigesimal system) diverge widely from the general lines

of Tibeto-Burman languages and are attributed to exterior, almost certainly Munda, influence. In the North Assam group are comprised the dialects spoken by the wild people living in the tangled hills east of Bhutan and north of the Brahmaputra in Assam. The Bodo group is centred in Assam with extensions to Goalpara, Jalpaiguri, and Cooch Behar. It includes the various dialects of Garo, Kachâri, and Tipura, as well as Deuri Chutiya, the speech of the priests of the Chutiyas and probably the original speech of Upper Assam. The Naga group is divided into no less than five sub-groups, Western, Central, Eastern, Naga-Bodo, and Naga-Kuki. These languages are spoken in the hills south of the Brahmaputra in Assam from 27° N. to 25° N. and 92° E. to 93° 30′ E. The Kachin group extends from Upper Assam across Northern Burma beyond the Chinese boundary into Yunnan, and in Burma as far south as 22° 30′ N. The Kuki-Chin group includes Meithei and the Kuki-Chin languages proper. Meithei is the language of the Manipuris, whose home is the valley situated between Cachar and British Burma. The Kuki-Chin dialects fall into four divisions—(i) Northern, (ii) Central, (iii) Old Kuki, (iv) Southern Chin; and extend from the Jaintia and Naga Hills on the north to the Chittagong Hill Tracts and the Arakan Yoma to Cape Negrais. The Burma group extends from the Chittagong Hill Tracts to the Shan States from Myitkyina to Tavoy. The most important member is Burmese. Only Arakanese can in point of numbers claim mention. The Lolo group, whose original home is in the Taliang Shan, a range of mountains lying between the valleys of the Chien Chang and the Yangtse, is spoken along the entire north-eastern border of Burma from Myitkyina to Karenni. The Kachin-Burma hybrids are spoken in the extreme north of Burma, and are linguistically and ethnographically of far greater importance than their relatively insignificant numbers would suggest.

There are notorious exceptions to every generalization about Tibeto-Burman languages. As a rule, they are built up on a monosyllabic base; their numeral system is

mainly decimal; they are characterized by an extreme habit of specialization and differentiation; the concreteness of their thought is exemplified in the obligation to use pronominal prefixes with parts of the body and relations; the use of infixes to limit and give concrete form to the verbal forms is notable; the parts of speech are not sharply marked; and their inability to form abstract conceptions is most conspicuous in those languages which have not come into contact with Indo-Aryan languages. Generic determinatives are common in many dialects. The dialectical variations are so great that every stage of phonetic development and decay are clearly marked. Tibetan, Meithei, and Burmese (to some extent Arakanese also) possess written literatures, the characters being in each case of Indian origin. The language used differs sensibly from modern speech, offering evidence of phonetic changes and other modifications that have been effected since writing was first employed. Indian influence is conspicuous in Tibetan literature, while to Shan influence must be ascribed the interesting historical works of Manipur and of Burma.

Siamese-Chinese group.

To the Siamese-Chinese group belong (i) the Tai or Shan languages, (ii) the Karen languages, (iii) Chinese proper. The Tai languages are spoken over an area extending from Assam to Siam. The Salwin River is the only true line between the various forms of speech of this group. West of it are the Tai dialects of Assam, Khamti, Chinese Shan and Burmese Shan, and to the east of it Lu Hkun (practically two branches of the same form of speech), Lao, and Siamese. But for the fact that the tones of the same word in these seven forms of speech do not correspond, the languages would be mutually intelligible. The great development of the tone system, of generic determinatives, and the use of couplets appearing as devices to overcome the limitation imposed by the fact that every true Tai word is a monosyllable, are the main features of these languages. The order of the words is comparatively fixed but differs in each group, and in earlier times was fluid, as is witnessed by the Ahom literature.

The Karen languages are spoken along the whole of the eastern frontier of Burma proper from Yamethin to Mergui. They expand eastwards into Karenni and the more western of the southern Shan States, and westwards over the whole of the rural portions of the delta of the Irawadi. In the plains two main dialects, Sgau and Pwo, are found, while the Bghai or northern Karen group comprises eight dialects spoken in Karenni, a group of Karen States included in the southern Shan States. Chinese is steadily gaining ground in Burma, the number of speakers having more than doubled in the ten years 1901–11.

The literature of the Shans of Burma is considerable and chiefly religious, though some medical and historical works exist. Khamti and Ahom also have literatures. That of Ahom is rich in history, and the influence of Ahom is manifest in the great series of historical works which form the glory of Assamese literature.

Indo-European languages.

The Indo-European languages represented in India are for the most part members of the Eastern group. The western languages of that stock are also represented, but by persons whose domicile is for all intents and purposes in Europe. Over a quarter of a million persons speak English as their mother tongue. The eastern Indo-European languages belong either to the Eranian or to the Indo-Aryan group. The Eranian languages spoken in India are (i) modern Persian, (ii) Biloch and its dialects, (iii) Dehwari, (iv) Pushto, (v) the Ghalchah group. Modern Persian is spoken not, be it admitted, as a vernacular, but as a language of *belles lettres* among educated Musalmans and by a few traders and immigrants in Bombay, the Punjab, and Baluchistan. Biloch and its dialects, which fall into two main groups—Eastern, comprising Mari, Bugti, Rind, Magasi, and Dombki, and Western or Makrani, which includes a number of many sharply marked dialects—are spoken in Baluchistan. Taken as a whole these dialects represent a stage of phonetic development left behind by Persian some fifteen hundred years ago. The whole consonantal system of the

parent stock in its archaic purity has not been preserved by any one dialect, yet it can be pieced together by an easy process of selection. Dehwari is a genuine case of a debased dialect of modern Persian. It too has split up into dialects, all found in Baluchistan. Pushto has had many harsh things said of it, but even its severest critics admit it to be a language of much rude grandeur capable of expressing every shade of thought with wit and point and force, worthy of the strong, shrewd people whose tongue it is. Its home is in Baluchistan, stretching thence north to the Hazara country. Persian it is in some features, yet in others it inclines to fellowship with the Indo-Aryan group, but with features due to independent development. Two dialects exist—Pushto, spoken in the south and west of Baluchistan, and Pukhto, spoken in the north and east. The differences of the included vowel and consonant are notable as characteristic of the difference between the two. The only Ghalchah tongue spoken in India is Yudgha, a dialect of Munjani, which with its congeners is of interest as one of the links connecting the East Eranian with the Indo-Aryan languages.

Biloch has but a small literature, consisting mostly of folk songs and tales collected by European scholars. Pushto has a literature of a respectable size, written in a modification of the Arab-Persian alphabet.

The Pisaça languages, which survive in three or four dialects spoken in Kafiristan—Khowar of Chitral, Shina of Gilgit, Kashmiri, and Kohistani—may be described as partly Indian in their general character and partly Eranian, although they have in their isolated position developed some phonetic laws of their own. Kashmiri has some literature, including historical works of real value.

Indo-Aryan languages.

Modern Indo-Aryan vernaculars fall into two main groups, with a large intermediate group possessing characteristics in structure, phonetics, and vocabulary which show contact with the two main groups. The Inner group consists of but one language, Western Hindi, situated in the Gangetic Doab and the country immediately north and south of it. This area, known to Sanskrit

geographers as Madhyadès or the Middle Land, and also as Aryavarta or the home of the Aryans, is of peculiar importance as in it Sanskrit attained its final form; from it spread all the culture that is enshrined in Sanskrit; from it, too, in later times spread the great *lingua franca* of India, Hindostani, which is none other than the vernacular of this area on which a certain amount of literary polish has been bestowed and from which a few rustic idioms have been excluded. Here, too, is the famed battle-field of Panipat, where thrice the fate of India has been decided in bloody fray. Round this area on three sides is a band of mixed languages: Central Punjabi, Gujarati, Rajasthani of Rajputana and its neighbourhood, and Eastern Hindi. Outside this ring is the band of Outer languages: Kashmiri, which has a Pisaça basis; Lahnda, or the speech of the western Punjab; Sindhi, Marathi, Oriya, Bihari, Bengali, and Assamese. The differences between the Inner language and the Outer languages are as marked in phonetics as they are in structure. The Inner family, for instance, hardens its sibilants, while the Outer languages either soften them to *sh* or to *ch*, as in lo*ch*, or to *h* pure and simple. The Inner language is in the main analytic, while the Outer languages have passed through the analytic stage and are now synthetic. Simplicity and regularity are the marks of the Inner language as contrasted with the cumbersome complications of the grammar of the Outer languages. All of them have developed literature in modern times, some to a considerable degree of excellence. All, too, have recognized dialects, and the linguistic boundaries are not therefore capable of rigid demarcation.

The vernaculars of Indo-Aryan stock possess vocabularies ample enough to express every idea that the mind of man can conceive. The bulk of their words is derived from the Vedic period, with such modifications as phonetic laws, in many cases the same for every language, have effected. This class of word is termed *tadbhava* by Indian grammarians. Where the modifications have been augmented by special or local

causes and their original provenance obscured, they are termed *desyas*, or country-born. Words are taken direct from Sanskrit with especial freedom by literary languages whose divergence from common speech is notorious, and are known as *tatsamas*. Loan-words are in a few cases of Dravidian origin, in the majority of cases of Persian, and through Persian of Arabic origin. European influence has added slightly to their stock. Indo-Aryan speech tends to oust all other forms, but its progress is now slow. Other families have borrowed sometimes freely from Indo-Aryan languages, and with the words go many of the social ideals and ideas pertaining to them. In construction and phonetics Munda, Dravidian, and Tibeto-Burman influences can be traced in some Indo-Aryan vernaculars. The superiority of Indo-Aryan speech is partly due to its superior mass, partly and even largely to its power of dealing with every phase of human thought in contrast with the limited range of languages, such as those of the Munda group, of Nicobarese, of the unwritten languages of the Tibeto-Burman group, and of the Andamanese, all of which are unable to express abstract ideas, are restricted to concrete thought, possess copious vocabularies, and employ complicated classification devices, characteristics attributable not to a common origin nor to contacts, but to a common attitude of mind consistent with other manifestations of their social psychology.

Gipsy languages so called (dialects in which elements taken from various sources are discernible) are found in most provinces of India. The presence in European gipsy languages of words of Hindi stock indicates a relationship which can only be remote. Thieves' patter, merchants' argot, secret and sacred languages, women's speech, which often preserves archaic forms, have been studied, but not to exhaustion. A scientific investigation of the phonetics of dialectical varieties especially is greatly required.

Problems of scientific importance, still largely unsolved, are raised by the survival in India of isolated language

groups, such as Brahui, Andamanese, Nicobarese, and the Munda groups in central Bengal.

Indian languages afford examples of parallel as well as of divergent evolution. Such parallelism as there is is due, as in the case of the West Indo-European languages, to original unity of structure and to the general principles of development latent in their original form. Their divergence is due to (i) contact with different ethnic groups, (ii) inherent differences, and (iii) the separatist and fissiparous tendency of Indian society. Large unities are possible only under conditions—physical, political, and psycho-sociological—which, in varying degrees, are absent over large portions of the Peninsula. The prevalence and persistence of endogamy indicates a widespread 'illiberality of naturalization', and in the absence of disturbing causes each group tends to accentuate and to augment its homogeneity by perpetuating minor linguistic differences, instead of seeking to achieve individuality by integration with and merger in a larger and ever larger unity, social, linguistic, and political.

Customs

The plasm-cell of all societies is the family, and consists of an adult woman, her increase of children, and the man or men who is or are entitled by society to exercise marital rights over that woman. If only one man is entitled to be the husband of the woman, the family is monandrous, but it is polyandrous if more than one man is entitled to marital relations with her. Polyandrous groups still exist in India. They are of two classes: in the one, designated fraternal, only brothers are entitled to marital rights over the woman; and in the other, designated general, the husbands are not necessarily related. The term 'brothers' covers both own brothers and clan brothers, members of the same clan and of the same generation. Polyandry survives among the Todas in both forms, the general form being very rare. Extreme laxity characterizes the sexual relations of the Todas (Madras, Nilgiri Hills). In the Madras Presidency

The Family.

Polyandry.

polyandry exists, or till recently did exist, in the fraternal form among the Nairs (Malabar), the jungle Kurumbas of the Nilgiris, who practise the fraternal form and also allow their women to others, the Kanisans or astrologers of Malabar. In the Punjab it is peculiar to the Himalayas, in the Kulu subdivision, the Bashahr, Nahan, Mandi and Suket States, among the Kanets of the higher hills and among lower castes, while Rajputs and other castes residing in these tracts have been influenced by it. It is found in Kashmir and under Tibetan influence in Bhutan. It is attributed to (i) poverty and the desire to prevent the division of property, (ii) the desire to free the warlike classes, such as Nairs of Malabar, from family attachments. Survivals of this practice are held to be birth rites, when the assertion of paternity by the father is a special feature, as among the Badagas of the Nilgiris and in details of the marriage rites known as *talikettu* in Madras, practised in Malabar by Nairs, Kammalans, Iluvans (among whom the rite is called *vitil kettu*), Konars of the Tamil country, and in legends such as that of Draupadi the wife of the Pandavas. Polyandry is often a polite term for what plain folk call adultery and prostitution. The Santals consider that an elder brother who forbids his wife to be familiar with his younger brothers is a churl. The term polygynous applies to those groups which permit one man to be the husband of, and to have exclusive marital rights over more than one woman. The extent to which polygyny prevails in India may be best judged by statistics. The excess of wives is greatest (31 *per mille*) amongst Animists, who form the lower strata of Indian society; next among Muhammadans (21 *per mille*); and in the case of Hindus and Buddhists it is only 7 and 8 *per mille*. It exists along with polyandry among the Todas.

Polygyny.

Clans.

The next grouping, based on families, is that of clans, where, again, descent from a common ancestor is the bond. When the common ancestor is a male, the clan is patrilineal. If the common ancestor is a woman, the clan is matrilineal. Where the husband resides with the wife's family, matrilocality is evident. Where the wife's kin

Matri-lineal.

have authority over the issue of the marriage and over property, the system is matripotestal. The patrilineal clan is by far the most usual. Matrilineal clans exist among the Khasis, Garos, and Rabhas of Assam and in Madras; in Malabar, Travancore, Cochin, and Kanara, among all castes, including a section of Nambudri Brahmans. Survivals of this system of reckoning kinship have been traced in the custom of inheritance by which property passes to the sister's son, as in Kanara (*aliya santana*); in cousin marriage, a device employed by the matrilineal Garos as by many communities in southern India, including Brahmans, to keep the family property intact; in the rôle assigned at weddings, in certain name-giving customs, and funerals to the maternal uncle and the sister's son; and to the recognition of the right of the mother to a portion of the bride-price as milk price (*shir-paili*) among the Brahuis of Baluchistan, the Palaungs of Upper Burma, in the rights of mothers' clan over her after marriage and over her children; and, in the case of Burma, in the high economic status and the freedom of women.[1] In the Punjab the custom of *chandavand* orders the division of property in a polygynous family *per stirpes*, not *per capita*, an arrangement quite compatible with the general patrilineal order. Cases of this mode of inheritance and succession have been mistaken for matrilineal succession. The male issue of women dedicated to the service of a deity, a recognized mode of prostitution, inherits from the maternal grandfather. There are traces of the custom by which a sonless man with daughters could appoint a daughter—the *putrika putra*—whose issue should succeed to him. The custom of *Pachhango*—followed in parts of Kashmir—allows an elderly man with a young wife to import an outsider to beget children for him.

Tribes.

A tribe is defined for the purposes of Indian sociology as a collection of families or groups of families (clans, as termed above), bearing a common name, generally claiming

[1] Burma Research Society *Journal*, vol. i, pt. i, 1889, pp. 103 seqq. The facts adduced are susceptible of other and simpler explanations than either survival of matrilineal organization or communal marriage.

descent from a common ancestor, in some parts (e.g. in Baluchistan) held together rather by the obligation of blood feud than by the tradition of kinship, usually speaking the same language and occupying or claiming to occupy a definite tract of country. Kinship is here reinforced by community of speech and of habitation. The territorial basis of social groups appears earlier, for in Assam, in the Dafla and Abor Hills, there are instances of a clan occupying a single large house. Naga villages are often sharply distinct from other neighbouring villages in their speech, and are composed of clans each inhabiting a distinct quarter.

In the larger unities the principle of aggregation is no longer kinship, but political subordination. Such aggregates belong to history more than to sociology.

Caste: endogamy and exogamy.

A caste is a collection of families or groups of families, bearing a common name which usually denotes or is associated with a specific occupation, claiming descent from a common ancestor, professing to follow the same trade or calling, and regarded by those who are competent to give an opinion as forming a single homogeneous community. It is almost invariably endogamous in that a member of the large circle denoted by the common name may not marry outside that circle. Even this rule is broken. In the Punjab and in Assam inter-caste marriages take place. Within the circle there are usually a number of smaller circles, each of which is also endogamous—an important sociological fact. A caste is part of a systematically and elaborately graded society composed of semi-independent elements,[1] the ultimate principle of grading being either 'purity', as defined by sacerdotal standards varying according to locality, or social status or wealth or political power, with the Brahman in the highest place always.[2] The administrative organiza-

[1] The interdependence of castes is realized by study of their several functions. Higher castes depend, and are occasionally unpleasantly reminded that they depend, on lower castes for necessary assistance. Cf. Thurston, *T. and C. of Southern India*, vol. v, p. 346.

[2] The actual status of any Brahman group depends on its *jajmani*, i.e. the social group or groups which it serves. Punjab, *C. R.*, 1901, p. 310.

tion of caste varies (1) according to the province; (2) according to the tradition of the caste, the lower but economically important castes being organized in a more effective manner than higher non-functional groups. Castes rise and fall in public esteem according to the measure of their conformity to the rules of purity, e.g. in matters of aliment, remarriage of widows, child-marriage, &c. Many theories have been propounded of the origins of caste. Not one of them completely and satisfactorily explains all the facts. Yet in each there is a measure of truth, for each is complementary to the others. Whatever the causes, political or geographical, which have produced its homogeneity, the social organization of each homogeneous area in India has its own distinctive features, obviously the result of differential evolution under stress of differences of history, of physical and social environment. Yet if diversity is conspicuous, behind it all lurks a general unity of plan. It is all evidence of an age-long conflict, not yet concluded, between the forces which impel to a wider unity and those narrow tendencies which separate and keep asunder social groups. The net result is in the nature of a compromise, and the preservation of this notable rigidity in the framework of Indian society is to be ascribed to the strength and persistence of the social ideals which decisively mark the lower culture. To the operation of common principles, the principles of Brahmanism, upon the material of the lower culture it is legitimate and scientific to ascribe the common features of the several Indian systems. Ethnic jealousy, economic evolution, the chances and changes of a singularly eventful history, the ambition of an organized close corporation of priests, the inveterate habit of social imitation, have all contributed to produce the present complicated tangle of systems. Viewed statically, Indian society is rigid and immobile, yet there is evidence enough and to spare that it is capable of great changes, and that its exclusiveness, its habit of endogamy, break down in the long run and permit slowly the infiltration at many points of external influences. The terms exogamy and endogamy designate marriage

regulations affecting clans and, by derivation, the families of which clans are composed. A group which does not marry within itself is exogamous. It is negatively or imperfectly exogamous when there are no corresponding definite relationship groups into which marriage is prescribed. When such groups are positively prescribed, then definite exogamy appears. The *gotras* or clans forming a caste are thus negatively exogamous. Cases of definite exogamy occur rarely, as in the case of the Karens, Kachins, Marips of Upper Burma, the Chirus, Tarau, Ronte, and Chawte of the Manipur-Lushei Hills. By local exogamy, as a rule, marriages between people of the same locality or village are forbidden: 'The Hindu always seeks his wife at a distance from his own home.' The Upper Burma cases cited above are of this class, and it is found among the Andamanese tribe known as Onge; among tribes in the United Provinces of low status, Kanjar, Sansiya, Habura, &c.; among the Gadabas and Kondhs of northern Madras; among Lewa-Kanbis, and Rajputs in Baroda, who live outside towns.

Exogamy rests on the belief, in cases where such belief can be traced, that a breach of the rule will bring some calamity on the community. Hence, either the offending couple are expelled or otherwise punished, or definite rites are performed to prevent or to minimize the trouble. The sanction is almost automatic in its operation.

Endogamy is marriage within a group. A Pathan girl should properly marry a Pathan, a Baloch girl a Baloch, a Brahui girl a Brahui. If, on the other side of India, a Sawntung Karen woman eloped with a Shan, Taungthu, or Burmese, the former custom was to kill the offending pair. The Karens generally are strictly endogamous, as regards persons not of Karen race. Muhammadan social groups (Shaikh, Sayed, Mogul, Pathan) are usually endogamous.

Ethnic groups, consisting of compact tribes like the Rajputs of Rajputana, the Dravidian Mundas, Oraons, and Santals of Chota Nagpur, the Naga tribes of Assam, the

Animistic tribes of Baroda, the Palaungs of Upper Burma, are endogamous in the sense of disapproving strongly of mixed marriages, which nevertheless take place. Linguistic, territorial, functional, sectarian, and social groups are commonly endogamous. Sometimes there is only one *gotra* in a caste, and it is perforce endogamous. Special groups, like the Royal clan among the Kacharis of Assam, and priestly castes as the Krishnavakkars in Madras, are endogamous. Public disapproval, expulsion from the community, seem the penalties for a breach of the law of endogamy. Local endogamy is also found, as when town groups refuse to marry with corresponding country groups.

Further complications are added by tables of prohibited degrees, which in some cases take the place of exogamic rules; by artificial kinship, or foster-kinship, or friendship ties (*bhaiyadi*); by adoption, or by religious and spiritual kinship.

Hypergamy.

When, as is usually the case, the clans composing a tribe, or the *gotras* composing a caste, are on an equal footing as regards intermarriage, they are isogamous. When the clans are graded in a strict precedence, based on religious or social or other principles, they are hypergamous. Marriages between men of a higher class and women of a lower class are termed *anuloma*, with the hair, according to the order of nature; marriages of women of a higher class with men of a lower are *pratiloma*, against the hair, unnatural. The way in which hypergamy works is this. A caste *X* consists of three hypergamous groups, *a*, *b*, and *c*, each consisting of any number of exogamous *gotras*, subject to the law of exogamy. Men of group *a* get their wives from *a*, *b*, and *c*; the men of group *b* get their wives from groups *b* and *c*; and the men of group *c* are restricted to women of group *c* who do not belong to their own exogamous *gotra*. The women of group *a*, subject to the law of exogamy, can get husbands only among the men of group *a*; the women of group *b* can get husbands both in group *b* and group *a*, but not from group *c*; the women of group *c* are tied

down to the men of group *c* who are not forbidden to them by the law of exogamy. To this custom are traced female infanticide, competition for bridegrooms, the bridegroom price, and wholesale polygamy. In fact, marriage became a lucrative profession for the fortunate males of the Kulin Brahmans of Bengal.

The higher grades of Hindu society have no monopoly of hypergamy. In some form or other it can be traced among the Thado Kukis, among the Khokhars, the Mundas, among lower castes in the United Provinces, in the Punjab, and in Madras. The Muhammadan groups are, in many areas, hypergamous.

Henogamy.

Henogamy, a rare rule which restricts marriage to the eldest son of a family, is found among the Brahman communities of Malabar. The reason alleged is that the eldest is the fruit of a spiritual union, while later children are the fruit of sexual desire. For a Brahman, particularly, the sexual relationship is supposed to end when the first son is born, for the son is considered to be the Self. The mother is the mother of the Self—to be respected as the husband's own mother. The performance of the funeral rites of the husband in the fifth month of the first pregnancy (Kochhar Khatris of Punjab), and the *devkaj*, the re-marriage of the parents after the birth of the first son, are due to this belief.

Divorce.

Divorce is permitted by Muhammadans, Buddhists, and in the lower culture, but forbidden by Hindu and Jain customs. In Baluchistan the small Hindu community still resorts not infrequently to this heretical practice.

Divisions in social organization.

There are other lines of social organization. The sex division is important. Further, there are the mature and the immature. Maturity is not only a physical fact, it is also a social fact; and while marriage, the actual union of male and female, is for the socially and physically mature, in some cases, as exemplified by differences of mortuary ritual, maturity depends on fertility. The sterile are treated as if unmarried and immature. There are degrees of maturity as there are degrees of immaturity.

There are persons and classes who stand apart by reason of special functions—priests, chiefs, warriors, artisans, especially blacksmiths, pregnant women. Hence, there are rites to be performed and restrictions to be observed by each of these classes, as by other social groupings, by families, by clans, by tribes, by villages, by castes. Some of these rites and restrictions are permanent, others are occasional and temporary. There are rites to mark and to facilitate the passage of the individual from one stage of social life to another.

Joint family.

The joint family, the most important Hindu social institution, is a community the members of which are all descended through males from a common male ancestor.[1] When economic conditions ceased to be simple, the need for careful distinctions between ownership embracing the power of alienation, managership, and enjoyment arose. The main[2] schools of law in India are the *Mitacshara*, current in the greater part of India, and the *Dayabhaga*, valid in Bengal. By the Mitacshara the sons are joined with their father during his lifetime. Together they form a corporation, and enjoy and manage the joint property. The father or the eldest male is the manager, assisted and controlled by the other members of the family. No one can separately dispose of any part of the joint property. The sons have a right to demand partition against their father. The Dayabhaga gives the sons no rights of ownership or management so long as their father enjoys legal existence, which may be determined by physical death, or by social death, e. g. if he withdraws from worldly affairs. On his death his surviving sons and those of his grandsons whose fathers have predeceased him

[1] This definition excludes the Malabar *Tarwad*, in which the principle of kinship is traced through woman. See Thurston, *T. and C. of Southern India*, s. v. *Tarwad*, also vol. v, p. 302.

[2] Indian law is based on custom, and the Courts recognize the 'validity of customs differing from the general Hindu law'. See Mayne, *op. cit.*, p. 55. In fact, customary law as distinct from the law recorded in the Shastras is acquiring great importance owing to the general progress of the hitherto backward groups. Other 'Schools of law in India' are the Western Indian, the Southern Indian, and the Mithila schools.

become owners, and may, but are not compelled to, effect partition.

The rules of partition differ. By Mitacshara law the pedigree must be reconstructed *ab initio* and the *stirpes* ascertained, when the partition proceeds *per stirpes*. The Dayabhaga law is founded on elaborate rules based on the religious principle that heirship is proportional to the spiritual benefits conferred on the deceased ancestor by funeral oblations.

Separate property can be acquired in various ways, by learning, by gift, by marriage, by labour, apart from use of the joint property, the presumption being that the earnings of all the members belong to the common stock. The rules which govern the inheritance of separate property under the Dayabhaga follow the rules for partition. The Mitacshara rules lead to very similar results. There are differences. The Dayabhaga admits cognates earlier than the Mitacshara, which excludes them until all agnates are exhausted. The Dayabhaga puts the father before the mother, while the Mitacshara prefers her to the father. Dispositions *inter vivos* are allowed as regards joint property under the Dayabhaga, as regards separate property under both systems.

English influence has led to the recognition of testamentary dispositions of self-acquired property, and, in the Dayabhaga area, of the testator's share in family property, with a limitation in favour of persons living at the time of his decease. The law relating to women's property exhibits women as obtaining only a restricted ownership.

The *Sanskara* rites.

Lists of the sixteen *sanskaras*, rites essential for a high-caste Hindu, vary slightly. Some are pre-natal rites, intended to fertilize the bride, to procure male offspring, and to ensure safe delivery. The first rite on the living child is *jatakarma*, when the infant is given clarified butter out of a golden spoon before the navel string is divided. The name-giving rite, *nāmakarma*, follows, and then the presentation of the child, first to the moon, and later to the sun. The first occasion of giving the child solid food is marked by the rite *annaprasana*. The first

tonsure of the hair, *chulakarma*, the investiture with the sacred thread, *upanayana*, the first lesson in the Vedas, *vedarambha*, the return home from sojourn with the preceptor, *samavartana*, marriage, *bibaha*, follow in order. Some accounts make ear-piercing, *karnabhed*, one of the rites. The stages of his social life should be marked by appropriate rites. The first period ends with *upanayana*, investiture with the thread. The second, *Brahmachari*, begins with the process of education and ends with the return home. Marriage marks the beginning of a further stage, *grihastha*, which ends either with physical death or with social death, as when a man withdraws from secular life and retires to meditation as a forest recluse, *vanaprastha*, or in the higher, more difficult, more meritorious grade of *sannyasi*. Not one of these rites, not one of these social groupings, but has an exact counterpart sharply defined among groups of the lower culture.

Reincarnation.

The belief in reincarnation is widely held in India in the lower culture, among the Andamanese, the Lusheis, Nagas, Garos, Kacharis, and Rabhas of Assam, the Dombs and the Kondhs of Madras, the Kols, Mundas and Oraons of Chota Nagpur. Its origin is in the facts of group permanency and individual death, as well as in physical resemblances. In some cases it may be due to contact with Hinduism where it is an essential article of faith. The passionate desire for male offspring, so marked a feature of Hindu life, rests on the belief that sons alone can perform the funeral rites which liberate the soul from hell. Hence the derivation of *putra*, son, 'he who rescues from hell'. Indeed, the son is but the self reborn.

Marriage rites.

Fertility rites of various kinds, designed to produce children, in general form part of the marriage rites. At Hindu weddings a married woman who has borne children still living should be present to stimulate fertility in the bride. Should the union prove barren, recourse is had to various devices, such as worship of female ancestors, charms, pilgrimages, Hindu women often visiting the shrines of Muhammadan saints for this purpose. The sex

of the unborn child can, it is believed, be distinguished and controlled in many ways. Barrenness[1] is regarded universally as a disease due to supernatural agency. Hence exorcism is a common remedy.

When pregnancy is evident rites are performed to ensure a safe delivery, and to procure male offspring. Groups of the lower culture (Nagas, &c.) impose food and other tabus on pregnant women to prevent monstrous births or to secure normal children. The time of birth exposes the mother to peculiar dangers and attacks from the numerous evil spirit agencies. To protect her from harm many precautions are taken. She is held to be impure, partly for physical reasons and partly because she is specially liable to danger, and is kept separate for a period which may vary, generally according to the sex of the child, being as a rule longer for a son than for a daughter.

Customs connected with birth and infancy.

The curious custom called *couvade* is found in India among the Koravas, Koramas, Koratis and Yerukalas of Madras, among the Pomlas of Baroda and Bombay, and among the Nicobarese. The husband lies in, takes special diet, and is treated as an invalid. Due to the belief that a bond exists between him and his child—such that what he does and eats will affect the child—the Naga abstains from work, drink, several kinds of food, and from tobacco. The Lusheis attribute the need for this rest cure to the peculiar sensitiveness of the child's soul, which takes time to settle down and must not be disturbed. The pre-natal tabus imposed on the father are due to a similar idea. The converse holds true. If a girl child grinds her teeth it brings or portends evil to the father.

Names are given among Hindus on the twelfth or the seventeenth day after birth, among Musalmans on the seventh day, and among groups of the lower culture as a rule within the period of the mother's uncleanness. The name confers and expresses personality. As a part of the

[1] Much curious information on this point was collected during the census of 1911, and it is dealt with by Mr. Crooke in *The Popular Religion and Folklore of Northern India*.

child, the name influences the destinies of the child. The name is given by priests, astrologers, elders, and relations. In one case, that of the Aimol Old Kukis, the man's clan select the name for male children, the mother's clan give the name to female children. It is carefully chosen, by various methods of divination, or given according to the day of the week or the month, or to the place when and where the child is born, to the name of any official camping near the spot where the child is born, and (Rabhas of Assam) to interesting events in the mother's life. The names of deceased ancestors and relations are given expressly, because children are regarded as reincarnations, by Kols, Santals, and some Nagas. Hindus confer two names, one remaining secret and only revealed in the course of the marriage ceremonies. Knowledge of his name puts a man in the power of those who know it. Hence the tabu on personal names extends from the lower culture to Hinduism. Opprobrious names are given to prevent the effects of the evil eye. Names supplemented later in life by nicknames are given in accord with regular cycles of names in Burma (Karens, Palaungs), and in Manipur among Marrings and Kachins. The Andamanese have about twenty conventional names given as soon as pregnancy is evident. Nicknames are given later. Girls have flower names taken from one of sixteen trees which happens to be in flower when the girls reach puberty. Nicobarese often change their names by reason of the tabu on the names of the dead. On the death of both grandparents men assume the name of their grandfather, women that of their grandmother. Naming is a mode of contact, hence the tabu on the names of the dead and on the names of living relatives with whom intimacy is forbidden. A change of name effects, and is the social token of, a change of personality. Hence Deshashtha Brahmans give new names to their brides. Kols change the names of their children if sickly.[1] The

[1] Hahn, *op. cit.*, p. 121. The Nicobarese mourners also change their names 'with the object of deceiving the ghost of the deceased'. *Andaman Census Report*, 1901, p. 209.

custom called *teknonymy*, found among Kachins, Lusheis, Khasis, Garos, Palaungs, and among low groups in the United Provinces, requires the parents on the birth of a child to be known as the father or mother of So-and-so, as in part a token of change of status from the grade of immaturity to that of social maturity, and in part to avoid ill luck. Among Hindus it is used to get round the tabu on the use of the husband or wife's name by wife or husband.

Rites of initiation.

Initiation rites effect a change of social status, and are often signalized by a change of dress, of coiffure, of ornament, or by some mutilation. Tattooing is a common and widely spread form of mutilation, and serves as an initiatory rite aggregating an individual to a new social group or as a prophylactic against disease. It is found in every social stratum in India from the Andamanese to Brahmans. Other modes of mutilation are dilatation of the ear-lobes, common in Madras and among some Nagas; circumcision, as practised by Muhammadans for religious reasons; female circumcision (Baluchistan and Bombay), partly as a fertility rite, partly to prevent concupiscence; filing the teeth (Kadirs and Mala Vedars, Anamalai Hills and Travancore); amputation of a finger-joint of the wife of the eldest son of the grandfather on the birth of a grandchild (Cuddapah, North Arcot, and Salem). Branding is an initiatory rite among Oraons and Santals, dark-skinned peoples. It is regarded in many parts of India as a cure for epileptic fits. Todas brand the hands of pregnant women on their first pregnancy. When a girl is dedicated as a Basevi she is branded with emblems of Vishnu. As a religious ceremony branding is confined to Sri Vaishnavas and Madhvas. Hindu sects are usually discriminated by different caste and sectarian marks put on by means of white and coloured earth and metal stamps.

Rites at marriage.

Marriage rites range from the simplicity of the Andamanese, among whom the bridegroom runs away, is brought back forcibly and is made to sit in the bride's lap, when they are declared man and wife, to the complexity

of the Brahman marriage, which consists of five main divisions each divided into distinct and separate rites, each of which has a distinct name. These rites break the continuity of a family by transferring the woman to a different social group, constitute a new family, introduce two people to a distinct social grade, present the bride to the family gods of the bridegroom, emphasize the purpose of marriage, namely, the procreation of children, protect the individuals mainly concerned from the dangers attendant on entry into a new relationship both personal and social, and secure longevity especially for the husband. The groups concerned extend into the invisible world by reason of the relations with deceased ancestors, and into the physical world in the case of totemistic groups by reason of the relations with the totemic species: hence, in some cases, rites of ancestor worship and of totemic aggregation. Union is established by tying the clothes of the bridal pair together, by taking food together, and in some notable cases by actual blood covenant, a survival of which may be the use of red lead, *sindurdan*, in the marriage rites of high castes. The binding portion of the rite is among high castes usually the *sapta padi*, or seven steps or circuits round the sacrificial fire taken by bride and bridegroom.

The modes of obtaining a wife are (i) gift, (ii) purchase, (iii) exchange, (iv) servitude. Theoretically, the bride is given to her groom in Hindu society, and it is sinful to accept a price for her. In hypergamic groups a bridegroom-price has to be paid, varying according to the status, education, and position of the groom. The bride-price varies according to the age of the bride, to her looks, to the status of her family. In the main, economic considerations govern the bride-price, but it is in many cases fixed strictly by custom. The persons having an interest in the bride-price vary. Maternal relations often come in, perhaps as a relic of matrilineal organization. There are groups of the lower culture which maintain the interest of the wife's clan in her new family, and its increase even after her death.

Exchange marriage is either fixed by custom, as cousin marriage, or voluntary. Cousin marriages are connected with matrilineal organization, as among the Garos; with the desire to keep the family property intact, as with the Ayyar Brahmans; with religious reasons, as Islam regards the marriages of first cousins as peculiarly desirable; with physiological beliefs, as those held by the Brahuis that heredity follows the mother and the stock is kept pure if a man marries a cousin; for quasi-religious reasons, as with the Gonds, who deem the obligation absolute when brother and sister have a daughter and a son and hold it right and proper to provide a relation with a wife; for reasons of policy, as when a Lushei chief marries his son to the daughter of a related chief; for economic reasons, since a cousin's bride-price is less than that of an outsider. It is found in Burma among the Karens, Kachins, Lisus, Chins; in Assam among Mikirs, Rontes; in Kashmir; in the United Provinces among Gonds and Agarias; very commonly in Madras, where it has been regarded as a survival of the bisectional organization of Dravidian society and is known as *menarikam*, and in Baluchistan. Voluntary exchange marriages are common, extending sometimes, as in the Punjab, to four betrothals. The influence of economic considerations is unmistakable. The exogamic cycles are also a mode of exchange marriage. Marriage by servitude is also very common, especially among the lower castes and tribes of lower culture. The bridegroom serves in the house of the father-in-law for a term of years. Allied to this is the *khandhadiyo*, or probationary marriage (Baroda).[1] If the probationer and the girl get on together satisfactorily, the marriage rites are performed. If not, he goes away and is paid for his services by his father-in-law.

Features in the marriage rites, which are held to be survivals of marriage by capture, in many instances, on close analysis, show that the groups affected are age-

[1] *Baroda Census Report*, 1911, p. 175. In some exceptional cases this custom produces social effects analogous to those which naturally and normally occur in matrilineal societies.

groups and that the rite effects, as by show of force, the transfer of the bride and bridegroom from one age-group to another. Here and there are strange practices explicable on other grounds. In Baluchistan, among Pathans, a youth may claim a girl by flinging a sheep's head into her father's house or by snatching her head-dress, while Santals recognize the right of a girl to wed herself to a man by force against his will. In Hindu law marriage by capture is a recognized mode (*Rakshasa*), and is deemed appropriate for Rajputs and Kshatriyas. Many of the so-called survivals are due to a deliberate desire to revive customs believed to be antique. There are cases where the bridegroom is forcibly abducted. He is fined in Burma and in the Lushei Hills for his treason to his bachelor friends. Capture is rather a means of getting a woman than of regular marriage among the Lusheis, who used to take Bengali women prisoners on their raids into Cachar, and had families by them.

Marriages by choice of the parties are quite common in the lower culture, but impossible, practically, in the higher groups where women are habitually secluded.

Various tests are employed to prove to the world the fitness of the parties for marriage. A Naga lad in old times had to take a head. The Kallans, a thieving caste of Madras, let loose fierce bulls, and the men recover valuables tied to the bulls' horns in token of their prowess. The Gadaba girls apply a fire stick to a soft part of a lover's body, and if he stands the pain the marriage is decided upon. Among higher castes the horoscopes and pedigrees of both parties are carefully compared, the girls examined to see if they are physically fit, or if they have any unlucky curls or other marks on their persons, and the precautions which are taken, nominally at least, are so numerous and searching that it seems a matter for marvel that any man ever gets a wife at all.

Tree marriages are of two kinds: (i) where it is an essential part of the rite in every case, (ii) where it is employed in exceptional cases. The first kind is found

Tree marriages.

in Chota Nagpur among the Munda tribes and is a specific fertility rite. The second class of cases occurs very generally in India as one of the modes of substituted marriages: (i) to avoid the curse of widowhood; (ii) to effect a change of status, as where a bachelor seeks to marry a widow and, to acquire an equality of status with his bride, is first married to a tree, or where a younger brother seeks to marry before his elder brother has married, or to confer the status of married woman on an unmarried girl, or to confer the status of married man on a deceased bachelor where the rite is due to eschatological beliefs; (iii) to avoid ill-luck attendant on a third marriage; (iv) to divert to the tree some potential evil; (v) to acquire from the tree some potential benefit, as fertility; (vi) to aggregate the pair to a totem group; (vii) in fulfilment of a vow as a token of dedication; (viii) to obviate the social difficulties resulting from seasonal marriages. Substituted marriages take place with other objects, here a lamp, there (as in Kashmir) a post, among Rajputs a sword. When a new tank is dug a mango-tree is married to the tank before the tank is used. As a fertility rite, the village priest among the Oraons is married annually to a Sāl-tree. There are many features in the various marriage rites which seem to point to a wide extension of the root ideas underlying tree marriage.

Marriage seasons.

As a rule, for reasons which perhaps rest on economic grounds, marriages take place at stated periods of the social year. Certain months, and in each month certain periods, are regarded as unlucky for marriages. Astrological calculations fix the appropriate hour of Hindu marriages, while, as extreme cases, there are in Bombay, Madras, and Baroda, castes which have their marriages all on one day, sometimes, as in the case of the Kadwa Kanbis, at intervals of eleven years, the Bharvads at intervals of twelve, fifteen, or twenty-four years, the Motala Brahmans on the same day every fourth year.

Disposal of the dead.

The methods of disposing of the dead are (i) tree burial, (ii) desiccation, (iii) exposure, (iv) sepulture, (v) river burial, (vi) cremation, (vii) endocannibalism. These

methods are employed either separately or in combination—one part of the rites, for example, consisting of cremation, while at another period the ashes are buried. Tree burial, a mode of exposure, is practised by the Andamanese as an honour, by some Nagas and Kukis, by two groups of the Nicobarese peoples, by Maria Gonds of Central India in the case of married men. It was once practised by the Sadhs (United Provinces), where among other castes are curious customs associating trees and funeral rites in a marked and suggestive manner. Among Tamlu Nagas, Assam, a combination of tree burial and desiccation is practised. Desiccation, either by smoking or by other methods, is found among the Kukis, Lusheis of Assam, among the Khasis in the case of chiefs, in Burma in the case of Pongyis. Exposure is practised by the Mawken (Mergui Archipelago), by the Tibetans, and by the Parsis. Sepulture is very common. It is found among the groups of the lower culture extending from Burma to Bombay, among Muhammadans, among Hindus for reasons of religious belief, e.g. Sannyasis, Pisharotis, Lingayets, and Seonarayanis: for semi-religious reasons, as in the case of young children who have not cut their teeth; or of adults who die of disease, as small-pox or cholera or boils; or for social immaturity, as when unmarried or childless persons are buried, while married and fertile persons are cremated; or for economic reasons as inability to afford the expense of cremation.

River burial is part of the funeral rites of the Santals, is practised by Hindus, who deposit either the dead body itself or a portion of the ashes in the Ganges, by Tibetans, by Bhollas of Bengal alternatively with cremation or sepulture, by some Atiths (Bengal), by Sokiyars (Hazaribagh), and under Hindu influence by the Yakhas of Darjeeling. Cremation is closely associated with Hinduism, but there are cases where non-Hindu groups practise it in special cases. The Izhavas of Madras burn the eldest male and bury all others. The Jatapus (Madras) burn the bodies of those who die by snake-bite. The Palaungs of Upper Burma burn the bodies of old men and Pongyis.

The Marus, a Kachin tribe, Chin tribes generally, Garos, Khasis, Mikirs, Kacharis, and Santals burn their dead. In some of these cases Hindu influence is the cause.

There are traces of endocannibalism in Kanaur.

Beliefs concerning death and the soul.

Funeral rites in India vary in the general method of the disposal of the dead as well as in regard to the place, time, and other details, according to sex, social status, mode of death, religious beliefs of the deceased. In many cases the ritual is long and complex, serving various social purposes, and is shaped by current views as to the psychological constitution of man, the nature and causes of death, the special relation between conduct in life and death, and the social groups whose continuity is affected by the death of any person. The Andamanese postulate a duality, the soul is red and the spirit is black. Both partake of the form of the person to whom they belong. Evil comes from the soul, the duplicate of the living, and good from the spirit. The Lusheis think that each person has two *thlarao* or souls, one of which is wise and the other foolish. The Oraons believe that every man has two shades, one heavy and the other light. The heavy shade goes to Markha, the Oraon heaven, while the other remains among them. As a special case, the Kachins think that some people have two souls, while the ordinary folk have but one. Such gifted persons can afford to keep one soul in and to let the other out to play havoc. The spirits of the dead Bhotias are of two kinds, one visible and anthropomorphic, with a black skin, the other invisible, but so fatal that if its shadow falls on a man he is sure to die. 'The object of a Hindu funeral is nothing less than the investiture of the departed spirit with an intermediate gross body, a peculiar frame interposed, as it were parenthetically, between the terrestrial gross body which has just been destroyed by fire and the new terrestrial body which it is ultimately compelled to assume. Were this not done, the individualized spirit has nothing to withhold it from reabsorption into the universal soul except its incombustible subtle body, which, as composed of subtle elements, is proof against fire and incapable of

any sensations in the temporary heaven or hell through one or other of which every human spirit is forced to pass before returning to earth to be reinvested with a terrestrial gross body.' Ascetics such as the Sannyasis are *jivan mukta*, liberated from the bondage of the flesh: their subtle body has been destroyed by their mode of life, and the absorption of their soul into the infinite world-soul is immediate.

Death, the most striking solution of the continuity of the social solidarity, is often believed to have been brought into the world by the violation of a tabu, or to be due to witchcraft if the mechanical cause of death be not clear. Hence rites to determine the cause of death, sometimes by divination, e. g. Khasis and Hasalas of Mysore, or by automatic indications of the person responsible for the calamity. There are rites which indicate the fate of the spirit. In Upper India, ashes from a potter's kiln are placed in a shallow vessel and carefully smoothed. Next morning they are examined, and if found marked with footprints the soul will be reborn as a human being; if marked with claws the soul will return as a bird, while it will be a tree if there are wavy lines. The Kols assert that if the mark is that of a cat, the spirit has become evil and requires special offerings. The Baidyas determine in this way whether or not the ghost has departed. If there are marks, be they those of the family cat, the ghost still lingers and must be driven out by a competent person.

The mode of death and the fate of the spirit hereafter are intimately connected. The penalty for a breach of many group tabus is death. If a man be killed by a tiger, the explanation often offered is that he, or some member of the group to which he belongs, has committed an infraction of some group custom or tabu. But these cases of death—strange, unnerving, disturbing cases—entail not only physical death but also social and spiritual death. The man who dies thus is deemed incapable of reincarnation by the Nagas. The Oraons and Garos think that a man who is killed by a tiger becomes a tiger.

The social groups which are obliged by custom to take part in funeral rites vary according to the mode of the death and the status of the person deceased. Deaths which occasion a complete severance of the dead from the living implicate a wide extension of the social group; the higher or more special the rank of the dead man, the wider will be the group immediately involved. Funeral rites sever the dead from the living, unite the dead with those that have gone before, are followed necessarily, though at some interval, by rites reintegrating the immediate group affected by the death with other similar groups. Hence the dual aspect of funeral and mourning rites with further complications due to speculations as to the nature of the spirit. Hence, too, that curious double aspect of the spirits of the departed, eventually as definitely friendly, at first as inevitably hostile, as if aggrieved by the violence of their severance from their kin and seeking to revenge themselves on the only people they can touch and can hurt, namely their kin. This may be but the external reflex of the 'panic of grief' in which the group finds itself. The living depend upon the dead for help in many crises, and the dead are in a like manner dependent upon the living. Yet at Hindu funerals three generations only are worshipped, as if beyond that point the departed had passed out of ken, and as if the limits of social memory were then passed.

Religions

Lower cultures: Andamanese.

The religions of the lower culture in India vary enormously in detail and elaboration, but as will be seen from three fairly typical cases have many general resemblances. Sir Richard Temple tells us that the Andamanese believe in a deity, Puluga, the cause of all things, who has been identified with the storm. The word means 'spider' in certain Andamanese dialects. He has a wife, one son, and many daughters. He transmits his orders through his son to his daughters, who act as his messengers. He has no authority over evil spirits, to whom he points out offenders against himself. Acts displeasing to him are avoided from

fear of damage to the products of the jungle. Puluga used to dwell on the top of Saddle Peak, but now lives in the sky. There are two great harmful spirits, Eremchauga of the forest, and Juruwin of the sea. Both have wives and families. Minor evil spirits are termed Nila, and there is a numerous class, the Chol, practically spirits of disease. Fire frightens the Eremchauga. They avoid offending the

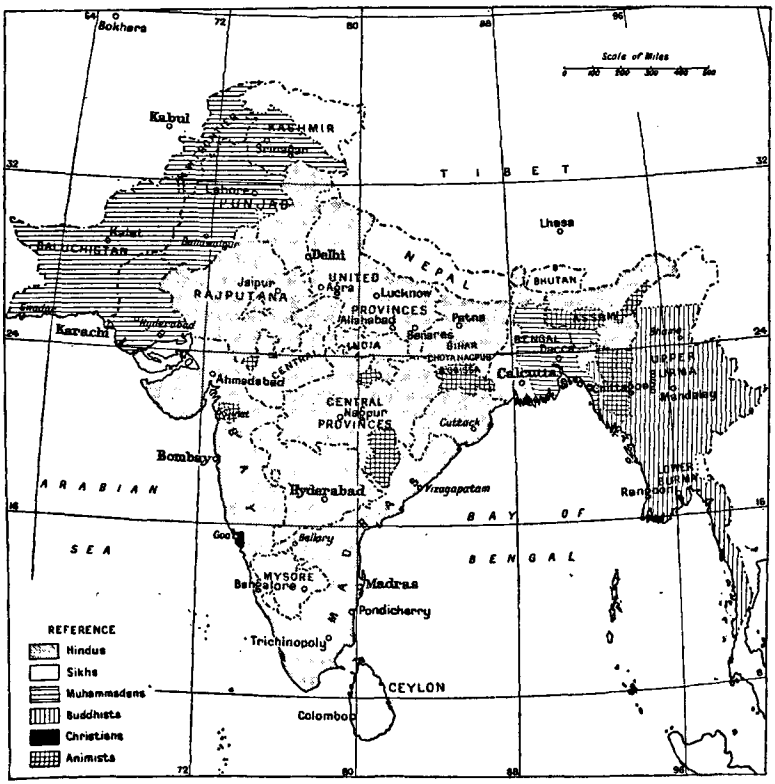

FIG. 12. Religions.

Sun and Moon by silence at their rise. Puluga, still an active creative agency, shows himself in storm. They appease him by throwing explosive leaves on the fire, and deter him by burning beeswax because he does not like the smell. Earthquakes are the sport of ancestors. The fauna known to the Andamanese are ancestors changed supernaturally into animals. Luratut, the kingfisher,

after the cataclysm which engulfed the islands and destroyed the fire, restored it to the people. The population previous to the cataclysm became the chauga or ghostly ancestors. There is much active faith in dreams and in the utterances of wise men, who practise an embryonic magic, but no ceremonial worship or propitiation, no form of appeal to supernatural powers.[1]

Kuki Lushai.

All divisions of the Kuki Lushai family believe in a spirit called Pathian, the creator of everything, a beneficent being who has but little concern with men. Far more important are the Huai, demons inhabiting every stream, mountain, and forest, to whom every misfortune and illness is attributed. Next there is a spirit known as Khuavang, sometimes spoken of as identical with Pathian, but generally considered to be inferior to him and more concerned with human beings—as in a sense the genius of men. Then there are the two Mivengtu, watchers of men, one a good spirit, the other bad. Each clan has a special spirit presiding over its destinies, known as Sakhua. The spirits of the dead are constantly present and need to be propitiated. There are also Lashi, spirits concerned only with wild animals, over which they have complete control. There are eight classes of sacrifice performed by Lushais—clan sacrifices, sacrifices to the Huai, sacrifices in case of sickness, to cure barrenness, to avert sickness generally, to ensure good hunting and good crops, to ensure possession after death of the spirits of the men and animals killed on earth. There is no regular priesthood, but each clan has a wise man *puithiam* (literally, much-knower), while certain clans have specialized in certain sickness rites. Any unusual occurrence is considered as portending some evil. Certain acts, dreams, or sights are universally considered as *thianglo* or unlucky. The village forge is a place of refuge and purification in certain cases. Certain persons, both

[1] *Andaman Census Report*, 1901, pp. 62 seqq. It is as well to observe that there has been acute controversy as to Puluga and Andamanese religion. Brown, 'The Religion of the Andaman Islanders,' *Folklore*, xx. 3, 257 seqq.; P. Schmidt, *Man*, 1910, pp. 2–7, pp. 66–71, pp. 82–6; Lang, *Man*, 1910, pp. 51–8; Brown, *Man*, 1910, pp. 33–7.

male and female but more generally female, have the power of putting themselves into communication with Khuavang. This power is called *zawl*. The *zawl-nei* are believed to give reliable information as to the right cure for sickness. They also believe in Khawring, possession of women by a spirit which abides in wild animals. Exorcism in such cases is effected by a turmoil of shouting, drum-beating, and firing of guns. The Lushais are firm believers in witchcraft, and maintain that the tribes to the north of them are proficient in it. Belief in the man-tiger is common through the hills.

Among the Oraons of Chota Nagpur the belief in one supreme Creator-God is current. He is identified with the Sun and is symbolized by the yellow of an egg. He has given the management of the world to tutelary deities and *bhuts* or devils whom they have to propitiate. He is invoked when all other devices have failed, and when they seek to remove the evil eye by a rite called *pal-khansna* or the breaking of teeth. The evil eye is attributed to aliens who may have come into or near the village. A long myth narrates the destruction of the Asurs, a race of Titans, workers of iron, by Dharmes, who tricked them into entering a burning furnace where they were all consumed. In this he was aided by the wife of one of them, whose son Baranda became his messenger and acts towards mankind just as the chaprasis of their zemindars oppress and harass them. The spirits of the Asur women whose husbands were destroyed rank as *deotas*, godlings, not as *bhuts*, and are household tutelary deities who might be troublesome. A regular sacrifice is expensive, but in its place a vow is made to make an offering when circumstances permit. The vow is fulfilled by a symbol or outline of a sacrifice. Ancestor worship plays an important part in their scheme, in naming rites, in times of sickness, at marriages, and as part of the funeral rites. The ancestors are invited to enter new houses and to partake of the firstfruits and to render them free for the people, and the more punctilious never taste rice beer without offering a drop to them. They

Oraons.

recognize and distinguish between household bhuts, sept or clan bhuts, village bhuts, village deotas, wandering bhuts, common deotas. The household bhuts are Baranda, the deceased ancestors, and the spirits of the Asur women. The sept bhut is Khunt Nasan, the power that never has been tamed and has carried off all the members of the clan. An annual sacrifice is offered to him by the eldest member of the family in the presence of all his kin. The village bhuts are of three classes, Khunt, the original settlers, the ghosts of all that have died a death which removes them from the cycle of rebirth and of women who have died in childbirth. The village deotas are—(i) Pat, the master of the bhuts, who keeps them under control, more or less, and with him his deputy, Duharia, who resides in the boundaries of the village and keeps watch on the bhuts; (ii) Chola Pacho, who lives in the sacred grove, has power to give or to withhold rain, and is the spirit of the old woman who sheltered Dharmes when he came to earth to punish the Asurs; (iii) Chandi, the goddess of hunting, who rejoices in familiarities from the young bachelors of the community; and (iv) Gaurea, the tutelary divinity of cattle. The wandering bhuts are many and noxious. Some are women under animal forms, some need human sacrifice and in return give wealth and prosperity. But most bhuts are powerless unless incited to mischief. To women who have studied the art, called Dain Bisahis, is ascribed the power of commanding the bhuts to do their wicked will through their knowledge of the mantras. The common deotas are the Earth—also regarded as a bhut or evil potency—and the Sun. To meet the needs of this complicated state of affairs, an elaborate organization of functionaries has been devised. First the whole community acts through its eldest members, the *panchayet*, or through the *sankatalas*, the representative of the *panchayet*. It deals with (1) Dharmes, (2) Baranda, (3) the spirits of the Asur women, and (4) the ancestors. Then there is the *pahan* or *baiga*, the village priest who is in charge of the tutelary divinities of the village. He is if possible a Kol. The *ojha* deals with

bhuts and Dain Bisahis, finds them out and drives them away. The *sokha* is a consulting specialist who is called in when the *ojha* or local practitioner is baffled in his quest. Then there is the *nagmotia*, the snake conjurer, who deals with bites of venomous animals, and the *onrha* who offers up human sacrifices. The educational organization of the Oraons extends beyond the Dhum Kuru, or Bachelor's Hall, to regular schools of instruction in the art of the *ojha* and *nagmotia*. They believe in dreams, omens, and divination.

The belief in possession is marked among the Oraons. It is employed at an important communal rite to remedy a succession of crop failures, due to the theft by some bhut of the *sarna dari*, the sacred fountain, where, in earthen pots or in bamboo tubes, a handful of everything produced in the country is placed, in order to enjoy the fertilizing power of the water. The whole village assembles in due course, and at last some one shows sign of possession, and in that state announces the bhut who is responsible for the calamity. There are five kinds of possession according to the different deotas that are responsible. Now a buffalo deity, now the monkey, Hanuman, now the tiger, enter into the victims and sport in human guise. When a man is permanently possessed, he is set aside, eats no meat, drinks no intoxicating liquor, and becomes a *bhakat*. The belief in possession is common among groups of the lower culture, and is perhaps related in one aspect with the belief, almost equally common, that special persons can at will assume animal forms, especially that of the tiger.

Totemism among Dravidian peoples (lower culture).

Totemism flourishes among the groups of the lower culture of the Dravidian peoples, such as the Mundas and Oraons, and is found among Hinduized groups, being more prevalent among Telugu-speaking peoples than among those speaking Tamil and Kanarese. Something resembling totemism is found in Assam, among the Khasis, Garos, Kacharis, and Meitheis. The eye of faith has discerned traces of totemism in Burma. It is the property, the patent, of a social group which deems each

and every member of itself to be in special intimate relation with each and every member of some external group (animal or vegetable in most cases). The social group is often distinguished from other similarly constituted groups with which it is associated by bearing the name of its totem. The social group acts as a group on occasions such as marriage, ancestor worship, and agricultural rites. Hence, on such occasions, by simple association, the unity of the group is completed and emphasized by rites affecting or regarding the totem. All over India many cases of group tabus can be found among peoples who are not commonly deemed totemic. Thus the Banyok of Upper Burma do not use gold or silver or precious stones, while on the other side of India, in Baluchistan, certain Umrani Baloch deliberately refrain from plastering their roofs because they say one of their forefathers died under a plastered roof. The sanction of these tabus is the belief that if violated death, sickness, or some calamity will happen either to the violator or to some one of his group.[1] Wherever group consciousness is strong, and belief in the power of 'things' to affect human beings is flourishing, these group tabus readily originate and persist.

Personality, magic, &c.

Personality, as understood in the lower culture, extends to the name, the shadow, the image, the hair, the food, the excreta, the footprints, the clothing, and weapons, upon the principle that *totum ex parte*. Contact with the personality of any one can be established, therefore, in various ways. Magic is, and in some cases is recognized, as a contact and conflict of personalities. Hence, it is forbidden to speak your own name, hence the objections which in India confront the inquirer who seeks to photograph the jungle people, the care with which hair-clippings, food, and excreta are dealt with. Hence, too, the interment of weapons, &c., with the dead. The special powers which are credited to persons who are reputed to practise magic are acquired either by

[1] E. g. if a Savara were to count above twelve, he believes he would be devoured by a tiger. *T. and C. of Southern India*, vol. vi, p. 549.

inheritance or by study, or by special innate powers, as with the Kachins, who hold that magicians have double souls, or by purchase. There are things which possess magical power, either in themselves or as being the abode or symbol of some exteriorized power or spirit, or when employed by special persons at special times. Disease, which is due either to magic or to the wrath of some deity, or to the automatic action of some broken tabu, is a state which can often be transferred from the sufferer; and many are the rites which effect this. In other cases, sickness is cured by removing a material object, regarded as either the disease itself or as the abode or token of the disease. Side by side with all this is found an intimate knowledge of the medicinal properties of many of the jungle products, even a knowledge of simple surgery.

Hinduism.

On every ground—age, importance, interest and difficulty—Hinduism comes first of all the religions of India. What, then, is Hinduism? Magic tempered by metaphysics, or animism more or less transformed by philosophy, says one crisp epigram. Pure theism, pleads another. The residue that is neither Muhammadan, nor Parsi, nor Buddhist, nor Sikh, nor Animist, nor Christian, urges a third. It is much more than a religion, as that word is used in occidental thought. As a reasoned authoritative rule of life it embraces philosophy, metaphysics, cosmogony, theology, psychology, sociology, medicine, art, law, economics, agriculture. It is a compact, fairly consistent, organic growth. Each part supports and strengthens all the rest. It is the result of long centuries, the sum and total not of one but of many heterogeneous cultures, and the core of it is still visible and living. The foundation of modern Hinduism is not in esoteric Vedantism, yet the Arya Samaj, the most successful and most important of modern Theistic sects, regards the Vedas as the only authoritative scripture. Far and wide in Upper India have spread the doctrines of Tulsi Das, 'a noble figure, unapproached and solitary in its niche in the Temple of Fame, shining in its own pure radiance as the guide and

saviour of Hindustan,' whose most characteristic doctrines are said to have been 'almost certainly adopted from the Nestorians'.[1]

Two beliefs are common both to the learned and the unlearned, the belief in *karma*, that the fate of the soul is determined by its actions in this life, and the belief that *mukti*, the liberation of the soul from future terrestrial existence, is to be greatly desired and steadfastly sought after. The belief that the soul is constantly reborn in conditions determined by its *karma* is general, but not universal, as some of the lower castes think that when they die they will go either to Paradise, *Svarga*, or to Hell, *Narak*, without any intervening births.

The soul and relations with God.

Neither the belief that the acts of this life affect and determine the fate of the soul, nor that the souls of men are liable to rebirth, are peculiar to Hinduism. *Mukti*, the cherished ideal, can be attained by three roads, *marga*: the road of faith, *bhakti*; the road of works, *karma*; the road of knowledge, *gnyan*. Neither, separately, is adequate to the end, but each supplements the others. Small wonder that we are told that in practice the people seem to understand the meaning of *mukti*, but in most cases seek not *mukti*, but either a happier rebirth or *svarga*, paradise.

When we come to the philosophy of it, to the nature of the soul and its relations with God, the world-soul, the diversities of thought are many and notable, extending from absolute monism as taught by Sankaracharya, which survives in Saivaism, to a dualism which credits the soul with freedom of will. These fine fancies of philosophy hardly touch the great mass of the population, who firmly believe in one Supreme Being, variously called Bhagvan, Parameshwar, Ishwar or Narain. Upon this view the great Trinity of Hindu deities is to be resolved into a mystic unity: 'The Supreme Deity, His Incarnation and His Energic Power—consecrated by a passionate bhakti (fervent faith), directed either to the Incarnation or to

[1] *Imperial Gazetteer of India*, p. 418; but see North-West Provinces and Oudh *Census Report*, 1901, p. 74, where a different view is stated.

the Energic Power conceived as a Person.' Of the three gods who, in ordinary parlance, compose the Hindu Trinity, Brahma the Creator has lapsed into that oblivion which is the lot of the Creator deity in other cultures. In all India there are but four shrines for his worship. Far otherwise is it with Siva and Vishnu, the types respectively of the restless energy of great cosmic forces which are manifest in that destructive energy which ever issues anew in fresh creations, and of stability and conservation. Siva is now austerity itself, now he is the leader of wildest Bacchanalian riot. His diverse manifestations argue wide diversity of origin. His worship is spread from Kashmir to the south, due to the lifelong efforts of the great Saivaite teacher Sankaracharya, whose origin was in Malabar. Vishnu stands for the principles of preservation and repose. His ritual is luxuriant in contrast to the simplicity of that of Siva. Modern Vaishnavism in the worship of Radha-Krishna has 'too often degenerated into infamous licence'. Muttra on the Upper Jumna is the head-quarters of the Krishna cult. The Rama cult originated in Kosala. 'In the case of Vaishnavism as with Saivaism, the inspiration for reform came from the south.' In the Bengal delta the teachings of Chaitanya spread the worship of Radha-Krishna, while the Vaishnavism of Assam was founded by Sankar Deb, who was antecedent to Chaitanya and taught doctrines which differ in some important respects from those of the great Bengali mystic. Ascribe it to tolerance, to eclecticism, to apathy and indifference, to henotheism, to what we will, in practice these beliefs are not so sharply held as to be antagonistic. Now one aspect of Divine Power, now another, compels adoration and worship. Here and there, now and again, sectarian differences are fierce, but they make no appeal to the mass of men. Attempts have been made to classify Hindus into Vaishnavites or Saivaites, but with very little success. The aspect of Divine Power that appeals most vividly to the peasant, ever in close contact with the mysteries of nature, fails to stimulate the dwellers in the great towns. Between the

ideals and the necessities of a rural society dependent, and fully aware that it is dependent, on cosmic forces, and those of advanced communities to whom stability is of prime importance, there is a wide difference—as wide a difference as that between the ideals of the peasant and the philosopher. The Hindu community embraces every type of culture. Hindu religion provides the ideals and ministers to the necessities of every stage of social organization. There is no uniformity, but there is ever active a tendency to unity in Hindu society. The belief that finds one Supreme Deity in the many manifestations of Divine Power has been carried by the potency of popular poetry, such as that of Tulsi Das, amid the masses of men. As a result, perhaps, of this, while men have fought to the death in India over the nature of God, yet to-day the Mahant of the temple of Bodh Gaya is a Saiva ascetic, and the worship conducted there is of Vishnu, who is represented by an image of Buddha, and the most important shrines of the Vaishnavas of Bengal are in the keeping of Brahmans, who are themselves strict Saktas.

Hindu sects.

'Of Hindu sects there is a legion. They fall into two main categories, those who advocate the rival claims of one or other of the great Vedic deities or of Pauranik accretions to the orthodox pantheon, such as Durga, and those who either neglect or deny the regular deities. To the former class belong the Saivas or Smarthas, Saktas, Vaishnavas, Sauras, &c.; and to the latter the followers of Kabir, Nanak, Darya Das, and Seonarayan, the Satnamis, the Panchpiriyas, and many others.' There are sects who worship Muhammadan saints in addition to their own gods; reforming sects, Aryo Samaj, Brahmo Samaj, Dev Samaj; sects which mortify the flesh; sects which inculcate intelligent Epicureanism; sects which are open to all; sects for the intellectuals; sects for emotionalists; sects which, in their fanatic desire to prove that nothing is unclean since all is of God, glory in the filthiest practices; sects which cluster round the personality of some great teacher of simple morality; sects whose orgiastic rites done

at dark of night exhibit in its worst form the depravity to which mysticism often tends. Sectarian zeal often abates, and they are merged into the mass of orthodoxy.

Below the Devas and Devis, the high gods and goddesses of distinguished lineage, and in some cases of disgusting habits, come an army of godlings, *devatas*, whose relation to the Devas is compared to, perhaps suggested by, features of the civil administration: witness the simile which likens the Devas to the Sirkar, the vague, all-powerful government of India enthroned in the clouds of distant Simla; and the Devatas to the Hakimzila, the district magistrate, whose every activity is narrowed and circumscribed by a host of co-ordinate functionaries. There are godlings of nature, heroic and village godlings, godlings of disease, the sainted dead, the malevolent dead, ghosts, godlings who abide in trees or seek the shelter of snakes or of animals and in these forms demand worship. There are those who practise the black art, magic, the anti-social art which employs things sacred to work its selfish will. There are ancestors to be honoured and succoured, for the living and the dead are parts of one community, each dependent on the other. There are clan godlings, *kuldevata*, as there are village godlings, *gramdevata*. To deal with all this variety of powers, personal, nominate, impersonal, innominate, rites in equal luxury have been devised, sacrifices, prayers, prostrations, pilgrimages. Omit none, for all have power. In this spirit flock Hindus to the tomb of St. Francis Xavier at Goa, whenever an exposition is held.

Man that is born of woman has it in him to scale the heights of heaven, to acquire power equal to that of the high gods, hence all the penances, the austerities, the strange practices of the ascetics; and there was a day—it has not passed yet in parts of India—when the Brahman, himself a god, not only compelled the godlings to his will, but, by his *mantras*, by his knowledge of their ineffable names, and by his rites of sacrifice, bent the high gods to do his bidding.[1]

[1] P. C. Oman, *Mystics, Ascetics and Saints of India*, passim. Even now in

Small wonder that man in India seeks to free himself from the curse of rebirth when from the moment of his birth he is the sport of all the influences studied in the lore of the astrologers, soothsayers, and diviners, who flourish still. This is symptomatic of a habit of thought which excludes chance utterly, because all is, or can be shown to be, purposeful. If a crow should fly across the path of a man on a Tuesday morning, ere the sun is high, it means—it neither can nor need be accurately stated how—that all his enterprises that day will go wrong. It is useless to ask whether the bird knew all this or how it could cause it. Its appearance at that moment at that place was no accident; it was part of the cosmic purpose, and in the close network of causation which is this world, indications of what is to be are given to those who care to study the mysteries. Some of these indications have passed into the stock of common knowledge, and every peasant bows to them as the tokens of fate.

Worship of implements.

'At the time of the spring equinox there is a festival called Sri Panchami, when it is incumbent on every religiously-minded man to worship the implements or insignia of the vocation by which he lives. The soldier worships his sword, the cultivator his plough, the money-lender his ledger; the Thugs had a picturesque ritual for adoring the pickaxe with which they dug the graves of their victims; and, to take the most modern instance, the operatives in the jute mills near Calcutta bow down to the Glasgow-made engines which drive their looms.' In all this there is proof not only of the dependence of man on his symbols but of the reciprocal benefits which flow from the commerce of gods and men. It would be possible to find somewhere in India organized adoration by a definite group of every phenomenal manifestation of power. Thus the Saktas worship female energy, or Sakti (the active principle of production as manifested in one or other of the goddess wives of Siva), by rites known as Sakti puja. There are two divisions of Saktas: the right-

Kathiawar a Brahman is never troubled by plagues that harass his humbler fellows. Bombay, *Census Report*, 1911, p. 67.

handed, whose worship is open, public, and known; and the left-handed, of whose horrid hidden practices gossip tells many a tale. Sakti worship ranges far—from Assam to Quetta.

There is but little of organization in all this jumble of belief and practice. Appeals are made from time to time to the learned in the law, the Pundits of Nadia or of Benares or of Poona. The titular head of the *math* or monastery set up at Sringeri by Sankaracharya, the founder of modern Saivaism, has great authority throughout the Deccan. Nor are the Brahmans monopolists in the priestly office. Were that the test of orthodoxy many large groups (e.g. the Lingayets) would have to be classed as non-Hindu. No mere mechanical criterion works in the vast field of India. The nearest universal test is the sanctity of the cow—that divine animal, every inch of whose body is the abode of some god or goddess or force. Yet there are castes (Mysore) which are deemed Hindu, but eat beef, as there are castes which are never admitted to Hindu temples and never enjoy the ministrations of the Brahman, and castes which flout the Brahman and his pretensions. And this amorphous mass is ever growing, ever receiving new accretions.

Hindu toleration.

There are now, in parts of India (Punjab), movements afoot to prevent the disintegration of Hinduism by foreign influences, and in particular, by a process termed *suddhi*, which means purification, to raise the status of the untouchable classes who have everything to gain and very little to lose by wholesale secessions. There are those who argue that, as Hinduism was the oldest religion, the followers of all other religions are but perverts from the true faith and may therefore be readmitted.

The converts, sought or unsought, still come. Now some ambitious petty Raja seeks to better his status in the world and dubs himself Hindu, acquires a decent lineage, and displays the pretensions and prejudices of the parvenu; now a jungly tribe comes into contact with, and is finally, somehow more or less mysteriously, absorbed into the greater community. It acquires new social

ideals, it modifies old ideas, but seldom completely loses its identity. It is hard to explain as it is easy to justify this elastic ease of accommodation; but the soil is ready for the seed, and the doctrine of *avatars* (divine incarnations) smooths away all theological difficulties. The tribal deity still lives on, perhaps strengthened by the discovery that he has all along been perfectly respectable.

Hindu social polity.

Social polity of these groups, which recognize the supremacy of the Brahman, rests upon the distinction between the sacred and profane. To preserve and maintain the purity of those who are set apart by their status for something like permanent relations with the sacred world, elaborate and minute codes of behaviour have been drawn up. The distance within which pollution can be conveyed by a member of one caste to a member of another varies according to the difference between their caste. It was death, not so long ago, to the low-caste man who came within sixty-four feet of a warlike Nayar. Food tabus, indeed tabus of all kinds, surround and isolate the Brahman from contact with impurity which would cause him to lose his sanctity. Every social group has its own sanctity, as, and because, it has its own peculiar relations with the sacred world. Every group has therefore its own means of asserting, defining, and safeguarding its 'sanctity' as against the sanctity of other groups. Tabus which flourish in the lower culture are developed into permanent and universal rules of life for the Hindu.

Buddhism.

Buddhism, a world-religion that had its origin on Indian soil five centuries before Christ, survives in parts of India in a strangely modified form, and is the nominal faith of some ten and a quarter millions of people in Burma. It departs markedly from Hinduism in its psychology. It denies the existence of an individual soul. Personality is a combination of impermanent elements. The only quality which can be constantly predicated of it is its liability to change. There is no 'being', there is only 'becoming'. Physical reproduction is universal. What passes from one generation to another is organic life conditioned by the liability to change.

Individuality appears and exists under conditions which necessarily expose it to limitation, to modification, to constant readjustments, hence to errors and, finally, to sorrow, pain, decay, and death. Every act, every thought, every deed, inevitably bears its fruit. *Karma* appears as the sum of all the deeds, desires, thoughts, and utterances that have not achieved their full and final fruition. Each personality constantly adds to and modifies, as it is shaped and modified by, *karma*. No outside power is called in to avert the consequences of any act or thought, for that is impossible. Hence the gods are politely ignored as futile fictions. All is left to human endeavour, organized and directed by right principles. The noble or Aryan eightfold path which 'bestows understanding, which leads to peace, to insight, to the higher wisdom', consists of Right views, Right aspirations, Right speech, Right conduct, Right mode of living, Right effort, Right mindfulness, and Right rapture. Allowance must be made for the fact that at the time these doctrines were first promulgated, the content of many of the terms employed was settled and definite and is certainly different from the content of the terms which European writers use in translating Buddhist literature. It is not easy to find an egotistic basis for right conduct in a theory which denies the existence of the soul. Can there be any effective sanction for morality where there is no identity between the individual who runs up the account and the individual who has to settle it? It is a difficulty which Hinduism experiences. 'In practice there is no question that it (the belief in *karma*) is a real and powerful sanction.' But right conduct is right, and pays because it is right. Even where, as in Burma, Buddhism exists as a thin veneer of philosophy laid over the main structure of Shamanistic belief, it has done all that a polish can do to smooth, beautify, and brighten. It works where it still works only by abating its logical rigour and intellectual austerity. To it may be justly ascribed the gentle charity and courtesy of people like the Shans and Burmese. It sets a high ideal of life before its people.

Close and scientific attention is now being given by Buddhists and European scholars to the elucidation of its philosophy and psychology. The Buddhists of Burma belong generally to the School of the Hinayana, or lesser vehicle, while the Buddhism or Lamaism of Tibet and Nepal belongs to the School of the Mahayana. The worship of Dharma, common among lower castes in Bengal, has been identified as a survival of Buddhism mainly on the grounds that Dharma is meditated upon as Sunya Murti, or the representation of Void; that the great goal of Buddhism is *sunyata*, that void of which neither existence nor non-existence can be predicated; and that Dharma is not an inferior Deity but higher than Vishnu, than Siva, than Brahma, higher even than Parvati. Dharma Raj is in Hindu faith a title of Yama, King of the Nether Regions, Lord of the Dead; while the abstract concept of a scientific norm of conduct, which underlies the word, is notably developed in Hindu thought, which classifies Dharma as it regards individuals, families, castes, and territorial groups, regulating them by the principle that the interests of the wider group should prevail as against those of the lower. Buddhism is still professed by the Sarāks of Tigaria and Baramba and the adjoining parts of Cuttack.

Buddhists are engaged in propaganda work in India. The lofty principles and beautifully simple life enunciated by the founder of the religion appeal with force to the Tamil-speaking artisans and middle classes at Bangalore and Kolar, Mysore. Initiation consists in the disciple asking, and receiving, the vows at the hands of a Buddhist priest. The vows are—(i) the *tri saranam*, or the three refuges—the Buddha, the Law, the Order; and (ii) the five precepts, *pancha sila*, abstinence from taking life, from theft, from indulgence in evil passions, from falsehood, and from drunkenness.

The Jains.

Jainism, which originated in Bihar in the sixth century before Christ, rejects the authority of the Vedas, denies in theory the supremacy of the Brahman, and is open to all. The Jains are divided into ecclesiastics (*Yatis*) and laity (*Sravaks*). The Sravaks are divided into Gachhas

or groups (trees); at the head of each is a Sripujya, who is a member of the ascetic class—Gorji—attached to that group. Right knowledge, right belief, and right conduct lead to *moksha*, which means to them a spiritual life in some indefinable mansion of the blessed. They worship the saints who have attained this beatitude. Soul exists not only in organic structures but in stones or lumps of earth—in organic matter. Jainism is gradually drifting towards Hinduism. Brahmans are employed as priests. Inter-marriages between Jain Shrimalis and Vaishnavas of that community are not infrequent. If a Hindu girl marries a Jain, she attends Jain ceremonies in her husband's house and Hindu ceremonies at her parent's house. To Jainism and its doctrine *ahinsa parama dharma*, 'not to kill is the highest duty', is ascribed the substitution in Hindu rites of rice and pumpkins for animal sacrifices. There are three sects, the Digambaras, the Svetambaras, and the Dhundias or Sthanakavasi Svetambaras. The Digambaras, the sky clad, do not adorn their images with jewels, do not employ Brahmans, deny that women attain to eternal bliss, require their *gurus* to go naked and to feed from the hands of a disciple. The Svetambaras, white clad, adorn their images, admit Hindu idols, employ Brahmans, open heaven to women, clothe their *gurus* in white and allow them to feed from dishes. The Dhundias have no images or temples, worship the abstract ideal of Dharm, follow men who have conquered their passions, always carry a small broom to sweep all animal life out of their path, and wear a pad over the mouth to prevent them from swallowing any living thing. Women can attain to *siddh*, perfection. There are three classes of ascetics—Sadhus, Sadhwis, and Gorjis. The rules for the Sadhus and Sadhwis are strict. The Jains erect *apasaras* or monasteries, *dehras*, temples, and *pinjrapoles*, homes for cattle. The Jains are strict vegetarians and avoid certain vegetables, such as brinjals, potatoes, yams. Fasting is a recognized duty, and sometimes a Sadhu fasts to death. A sacred season, *Pachusan*, is marked by fasts and a communal service in which

forgiveness for all breaches of the law is solemnly asked for.

The principal seat of Jainism is Western India—Rajputana, Baroda, and Bombay; but members of this enterprising community—mostly of Vania or merchant class—are to be found all over India. Parasnath, the sacred hill of the Jains, is in Hazaribagh. It flourished at one time in Orissa, where the caves of Udayagiri and Khandagiri bear witness to its popularity in the early centuries of the Christian era. The influence of Jainism upon the early growth of Kanarese literature was very great.

Sikhism. The ideal creed of Sikhism involves belief in one God, condemns the worship of other deities, prohibits idolatry, pilgrimages to the great shrines of Hinduism, faith in omens, charms and witchcraft, and does not recognize ceremonial impurity at birth or death. It abolishes caste distinctions and Brahmanical supremacy. 'To distinguish his disciples from the Hindus among whom they lived Guru Govind Singh prescribed that every Sikh should bear the five marks, known as the five *ka*—the hair uncut (*kes*), the short drawers (*kachh*), the iron bangle (*kara*), the steel knife (*khanda*), the comb (*kangha*); that he should abstain from tobacco and eat no meat save that of animals decapitated by a single blow at the back of the neck.' Yet the great Sikh Gurus, from first to last, strove, like the modern Hindu reformers, not to break away from the ancient beliefs but to reconcile them with a purer creed. It is difficult to see in Sikhism more than a legitimate development of Hinduism. The relations of Sikhs with Hindus pure and simple are so intimate as to make a close distinction impossible. In one and the same family one brother may be a Kesdhari, another a Sahjdhari, and a third, while wearing the Kes, may be a Sarwaria who smokes the hukha. There are numerous Sikh sects, and the reactionary movement centred at Amritsar among Kesdhari Sikhs is now well organized into Khalsa Diwans and Singh Sabhas, affiliated to the chief Khalsa Diwan. The principal home of the Sikhs is in the Amritsar District of the Punjab. The ceremony

of initiation by baptism with water sprinkled from a two-edged dagger is sedulously performed by all recruits in the Sikh regiments which constitute so valuable and important a portion of the Indian Army.

The Parsis.

The ancestors of the Parsis fled to India from the oppression of the Muhammadan conquerors of Persia about thirteen hundred years ago. They believe in one god, Ahurmazd, creator of the universe, giver of all good things, who hears their prayers. Ahirman is the Evil One, the author of all evil.[1] Man has an immortal soul, which passes after death to reward, *beshesht*, or to punishment, *duzak*, according to conduct in life. *Humata, hukhta, huvrasta*, holy mind, holy speech, holy deeds, lead to heaven. *Dushmata, duzukhta, duzuvarata*, evil mind, evil speech, evil deeds, lead to hell. Importance is attached to the rites which the living survivors perform for the welfare of the souls of the deceased. Fire is especially holy in itself, and with the Sun, Moon, and Stars, and water, was created by Ahurmazd, and must be guarded from all pollution.

The Mobeds, who are chiefly domiciled in Navsari in Baroda, are the priests of the Parsis and perform all rites for them. For nine days and nights before actually engaging in priestly duties the Mobed must prepare himself by ceremonies, and be touched by no one. He cannot dine with a Behdin (layman), or eat food cooked by a Behdin while officiating. Initiation takes place between seven and nine, when the child assumes the sacred thread and shirt. The thread is daily untied and retied, but to abandon it is a token of apostasy. Parsis must keep their head and feet covered, always wear the sacred shirt and thread, never smoke, and must wash the hands if they ever put their fingers in their mouths. Faith in ghosts, magic, astrology and witchcraft is strong, especially among the women. Some sacrifice to Hindu deities and to Islamic saints at noted shrines. The division of

[1] As to the 'dualism' of the Parsi Religion, see *Imperial Gazetteer*, p. 440; also *Les Parsis*, by V. Henry, passim.

the Parsis into two sects over a matter of chronology has ceased to be of any importance.

The Muhammadans.

Muhammadanism is the faith of a creed and of a book. The creed is summed up in the Kalimah. There is but one God and Muhammad is his prophet. The book is the Koran. But the interpretations of the book and the nature of the soil in which the seed of the faith has been sown in the course of long centuries of active propagandism (now restricted to individual cases and to small areas such as Malabar) have given rise to sectarian distinctions which are not less interesting than those of Hinduism. The main sects are: (i) the Sunnis, who attribute authority to all the successors of Muhammad and to the Hadis, the traditional sayings of Muhammad which are not embodied in the Koran; (ii) the Shiahs, who deny authority to Abu Bakr, Omar and Osman, the first three successors in the Khaliphate, regard Ali as the first true Khalipha, and revere his martyred sons, Hasan and Hussein; (iii) the reforming sects, which now seek to eradicate superstitious practices not sanctioned by the Koran. There are sects which occupy positions intermediate between the Shiahs and the Sunnis, and are often denounced by both. There are four schools of commentary on the Koran and the Hadis, Hánafi, Sháfai, Maliki and Hambali. The first is the most numerous in India, but in the Deccan in parts the Sháfais preponderate. There are also the Ahli Hadis who interpret the tradition for themselves.

Muhammadans are strongest proportionately in Kashmir and the Punjab and eastern Bengal, in Sylhet and Sind, but are well represented in India generally, except Central Provinces and Burma. When we pass from the theologians to the people we find a welter of beliefs and practices which are easily explained, but are with difficulty reconcilable with the strict monotheism of pure Islam.

For the most part, the performance of circumcision, the five daily prayers, the assembled prayers on Fridays in a mosque, the abhorrence of pork, the clipping of the

moustache in the centre, the observance of fasts in Ramzan, and the celebration of the Ids, are looked on as the sum total of the teachings of the Koran and the Shar'a. Some of the Biloches deem it sufficient if the chief keeps all the fasts and prays all the prayers on behalf of his tribesmen.

Muhammadan association with Hindu practices.

Unreformed Muhammadans of the lower classes are often deeply infected with Hindu superstitions. They still join in the Hindu festivals, consult Hindu astrologers, worship Hindu godlings of disease. In Baluchistan the living beliefs of the tribesmen, nominally Muhammadan, have little to do with the religion they profess. Here, as elsewhere in India among Muhammadans, shrines and saints are objects of worship. The living saints are not without honour. In the Punjab every Muhammadan has a Pir as preceptor, who initiates him into the secrets of divine worship, secures divine forgiveness, and for all practical purposes stands nearer to them and higher than the Divine Being. The faithful, who believe that the dog is an unclean animal, must, ere they enter the potent shrine of Husain Nika, perform their meed of worship at the shrine of his dog hard by. Here we have in practice the conditional curse, the commemoration of ancestors by periodic worship, the reverence of the malevolent dead, beliefs in Jinns, and possession and exorcism, ceremonies which of themselves bring or stop the rain, holy men, whose power over nature is great, who bring the rain at will, or drive away the plague of locusts, or rid the wheat of rust. Here is tree marriage to fertilize the trees. Human fate is writ large on the shoulder-blade of a fresh-killed kid, for those who can read it. Here are a whole host of tabus, evidence that cannot be gainsaid, of an origin which is exterior and prior to Islam.

Christianity.

Christianity was brought to India at an early date, and the Syrian Christians of Malabar claim that their Church was established by St. Thomas, whose martyrdom, they believe, occurred in Mylapore, a suburb of Madras. In the opinion of Sir William Hunter 'there is evidence to indicate that Christianity had reached Malabar before

the end of the second century A. D.' At the present time they are divided into Latin or Romo-Syrians, owning the jurisdiction of the Pope; Jacobite Syrians, dependent on the Patriarch of Antioch; St. Thomas's Syrians, who claim ecclesiastical autonomy; and Chaldean Syrians, whose Archbishop derives his ordination from the Patriarch of Babylon. In many interesting respects they have preserved or have imitated Hindu customs. The succession to the priestly office is *marumakkathayam*, in the female line.

Catholic missions entered India at the beginning of the sixteenth century and were followed two centuries later by Protestant missions.

The diffusion of Christianity in India, the special difficulties which it has encountered, the hopes which its progress has raised, the lines on which its development is to proceed, the classes from which its converts are drawn, the status of Christian converts in the general community, are problems which must be considered in minute detail in all their aspects by all concerned, and involve a careful study of the complex conditions of Indian social life.

Jews. There are two ancient settlements of Jews in Western India, the one in Cochin and the other at Kolaba in Bombay. The latter are known as the Ben-i-Israil or sons of Israil. In both settlements there are two sections, a Black and a White, which to a large extent keep apart. The White Section in each case lays claim to greater racial purity and has admittedly a superior position. There are grounds for believing that the White Jews in Cochin are late comers.

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CHAPTER VII

POLITICAL GEOGRAPHY,[1] GOVERNMENT, AND ADMINISTRATION

By Vincent A. Smith

§ 1. Historical and General Observations

Three dominant geographical facts.

Three geographical facts dominated the course of the history of India until the close of the fifteenth century, namely: (1) the physical isolation of the sub-continent; (2) the separation of the southern, peninsular, and tropical region from the northern, continental, and sub-tropical area by a broad belt of hill and forest difficult to penetrate; and (3) the accessibility from the north-west of the rich alluvial plains of the north, traversed by huge navigable rivers, and easily overrun by any invader who had once gained entrance.

The physical isolation referred to was not absolute, although it was sufficiently complete to secure the development of India's peculiar form of civilization. The mountain barrier of the Himalayas and connected ranges effectively closes the way to any intimate communication with other lands, except through the passes on the north-western frontier. In ancient times, when powerful, permanent sea-going fleets were unknown, no nation attempted to hold the command of the sea for political purposes. The sea was a barrier of separation, not a bond of union, as it is now. The 6,600 miles of coast-line effectually protected peninsular India from political contact with the outer world, while permitting limited intercourse of a purely commercial nature. The broad belt

[1] [Accents in the spellings of Indian place-names (and other words) are not in sufficiently general use to necessitate their insertion throughout this work, but it has been considered appropriate to add them in the present chapter in accordance with customary usage in India. The letters ā and ī have the sounds of the long vowels in French; ū has the vowel sound in 'route'. The tendency in pronunciation of Indian names is towards equivalent stress on each syllable.]

of hill and forest, which may be called the Vindhyan barrier, shutting off peninsular from continental India, closed the road of invaders from the north, who ordinarily found in the great alluvial plains of the Indus, Ganges, and Brahmaputra ample scope for their advance and settlement.

Sectional history the result of physical conformation.

Under the conditions of ancient life, the physical conformation of India had the inevitable result of breaking up her history into local sections. Those sections, minor features being omitted, may be enumerated as (1) the Himalayan slopes, (2) the alluvial plain of the great northern rivers, (3) the central or Vindhyan barrier, and (4) the Deccan or Peninsula. The last region, again, is subdivided by nature into the Deccan proper, or the high plateau, north of the Tungabhadra and Krishnā Rivers, and the Tamil kingdoms of the far south.

The configuration of the Himalayan slopes necessarily produced a multitude of isolated kingdoms and principalities, seldom attaining high political eminence. The alluvial plain of the great rivers, with its rich soil, dense population, splendid waterways, and open country, was physically fitted to become, and actually became, the seat of mighty states, which from time to time essayed to dominate the whole of India, but never quite succeeded.

The course of Indian history changed in 1498.

The arrival of Vasco da Gama's three little ships at Calicut in May 1498 wholly changed the conditions and course of Indian history. We can now perceive that the function of the Portuguese was, not to conquer India for themselves, but to open the door for the English. The occupation of Goa in 1510 exposed to European attack the coasts of the Peninsula, formerly inviolate to foreign arms. When the Portuguese failed to make good the bold claim of their king to be 'Lord of the conquest, navigation, and commerce of Ethiopia, Arabia, Persia, and India', the Dutch and French in turn tried to seize the prize dropping from the feeble hands of Portugal; and when they, too, failed, the ripe fruit fell into the British lap. The north-western passes, heretofore the sole means of approach for an invader, had been turned. They now

became merely posterns, while the ports became the real gates of India. The central Vindhyan barrier lost its political significance, and the secluded kingdoms of the south were laid bare.

The Indian Empire won by the resources of Bengal.

The outline of the story of the manner in which the officers of the East India Company, starting from their 'factories' on the coasts of the Peninsula as bases, acquired the sovereignty of all India (except the Punjab and Sind) in the course of about sixty years, from 1757 to 1818, is more or less familiar to all readers. One point only need here be emphasized, namely, that the rulers of India must hold the Gangetic basin. The sovereignty of India was won by the facile conquest of Bengal at Plassey in 1757. The weak settlements on the Bombay and Madras coasts had not the needful strength for the enterprise, and would have been overwhelmed by the 'country powers', if Warren Hastings had not understood the problem of empire, and hurried to the support of Madras and Bombay every man and every rupee which could be drawn from rich Bengal. When we read the well-worn tale of the Carnatic wars, we do not always realize, I think, that the final success was won by the resources of Bengal. Dupleix, working with Hyderabad as his base, never could have become master of India.

Modern political geography independent of physical facts;

The growth of the British Empire in India from the coasts inwards has made of little account the geographical facts which formerly determined the course of history. The advance up the Ganges, supported by a sea-going fleet in reserve, has been a far surer and safer process than the advance down-stream of a conqueror relying on reserves in Macedonia or Central Asia. The necessity for keeping up communication between Bengal and the distant settlements of the south soon opened up paths across the Vindhyan barrier, while the freedom of the sea gave the strangers resources which no Asiatic power had ever dreamed of. Only thirty-three years after the battle of Plassey, Lord Cornwallis, a man of peace in principle, found that British honour compelled the rescue of Travancore in the far south from the clutches of Hyder

Ali (1790). The rapid development of mechanical science during the nineteenth century further weakened the ancient physical defences of India. Fortresses hitherto deemed impregnable fell an easy prey to disciplined troops armed with adequate artillery. Asīrgarh, the premier stronghold of India, guarding the main road from the north to the Deccan, which had cost even great Akbar a siege of eleven months, yielded to Malcolm in as many days. Steam power solved difficulties of movement and transport which earlier invaders had found insuperable. It is needless to labour the theme in detail.

The result is that the modern political geography of India, unlike the ancient, bears hardly any relation to the facts of physical configuration. The Bombay Presidency finds no difficulty in straddling across the Western Ghāts; the Vindhyan barrier is broken up among several provinces, and numerous bridges span every great river, so that no stream, however mighty, need necessarily be accepted as a provincial boundary.

Nearly independent of the Mogul boundaries.

In Akbar's time (A. D. 1600) the Mogul Empire was divided into fifteen provinces or Sūbas, increased to twenty in Aurangzeb's reign. Those divisions, too, have been almost wholly disregarded in the modern arrangements. The only Mogul Sūbas transferred in their entirety to the Company were Bengal and Bihār, and even those provinces, as now modified and defined, differ considerably from the Sūbas of Aurangzeb.

Formation of existing political geography.

The existing political geography, therefore, is neither based on physical configuration, nor derived from the Mogul delimitation. The oldest British provinces, the presidencies of Madras and Bombay, have grown gradually by accretions to settlements on the coast. Bengal and Bihār alone were acquired by sudden and complete conquest. As the tide of conquest flowed inland, new provinces have been formed and constantly modified with regard to the conditions of the moment and administrative convenience, without consideration of the physical features of the country or the arrangements of preceding governments. Even ethnic frontiers have been of small account.

The Government of India, long accustomed to cut and carve provinces at will, was disagreeably surprised when it found that the partition of Bengal in 1905 roused a national sentiment hitherto unsuspected.

British India.

In modern political geography the essential distinction is that between British India, occupying about three-fifths of the country, and the native or protected states, occupying the remainder. The legal definition of British India (52 & 53 Vict., cap. 63, sec. 18) is 'all territories and places within Her Majesty's dominions which are for the time being governed by Her Majesty through the Governor-General of India, or through any governor or other officer subordinate to the Governor-General of India'. British India, so defined, including regions outside the geographical limits of India, is now divided into fifteen provinces, great and small. The origin and administration of each are summarily described in § 3 of this chapter.

Number and relative importance of the native states.

The native or protected states seem to be 703 in number, varying in size from great kingdoms to petty areas comprising a village or two.[1] Excluding Nepāl and Bhutān with Sikkim, which enjoy independence in a greater degree than the others, the states may be ranked in order of importance, as indicated by population[2] in the following five classes:

Class I: (1) Hyderabad, or the Nizam's dominions.

Class II: (2) Mysore.

Class III: (3) Travancore; (4) Gwalior, or Sindia's dominions; (5) Kashmīr and Jummoo; (6) Jaipur or Ambēr; (7) Baroda or the Gaekwār's dominions; (8) Jodhpur or Mārwār; (9) Patiāla; (10) Rēwah; (11) Udaipur or Mēwār.

Class IV: (12) Kolhāpur; (13) Indore or Holkar's dominions; (14) Alwar; (15) Cochin; (16) Bahāwalpur;

[1] 693 as enumerated in *Indian Empire* (*Imp. Gaz.*, 1907), vol. iv, pp. 92–101, with a correction of 43 for 34 in the Punjab (ibid., vol. xx, pp. 332, 381), and the addition of Benares in the United Provinces of Agra and Oudh. This total includes Nepāl and Bhutān with Sikkim, which may be classed as independent.

[2] See Statistical Appendix, p. 470.

(17) Bhopāl; (18) Bhurtpore or Bharatpur; (19) Mayūrbhanj; (20) Bikanir; (21) Cooch Behar or Kūch Bihār; (22) Kotah; (23) Rāmpur.

CLASS V: The remaining 678, including 354 under the Bombay Government, chiefly in Kathiāwār and Gūjarāt; 148 in the Central India Agency under the Government of India; 52 under the Government of Burma; 43 under the Government of the Punjab, and 20 in the Rājputāna Agency under the Government of India.

The states mostly of modern origin.

A few of the above, such as Travancore, Cochin, and most of the Rājputāna states, are ancient kingdoms, but the majority are of modern origin, dating generally from the eighteenth century, and constituted nearly in their present form at the comprehensive settlement made by the Marquess of Hastings in 1817 and 1818, when 'existing acquisitions were recognized once for all, and the political situation, ruffled as it was by the storms of war and aggression, was in a moment petrified. . . . The volcanic origin of some of the political groups . . . is clearly revealed by the number of fragmentary States that still subsist in those parts of India where chaos reigned longest.' In some cases, as for instance in the Nizam's dominions, a great clearance and consolidation of petty chieftainships had taken place before the British power became paramount.

The legal status of the states.

Up to the time of the Marquess of Hastings (1813–23), the government of the East India Company generally recognized, theoretically at least, the independence of the Indian powers with which it came in contact, and avowedly dealt with them in accordance with the principles of international law. But, from the date named, the paramount position of the British power was openly asserted, and the native or protected states, whether great or small, became distinctly subordinate, losing their status as equal allies, although the old formulas might still be used in treaties and ceremonial documents, as they are to some extent even now. Since the Mutiny, the Government of India has not hesitated to exercise boldly its right to interfere with autonomous states, when grave misrule

occurs. In 1891, when dealing with the Manipur case, the secretary of state further asserted it to be admittedly 'the right and the duty of Government to settle successions in the protected states of India generally'. The proclamation of Queen Victoria as Empress of India on January 1, 1877, and the resultant ceremonials on several occasions have emphasized the fact that the princes and peoples of the protected states are now British subjects, so far as international relations are concerned. No native state is allowed to enter into any relations with a foreign power (39 & 40 Vict., cap. 46, preamble). All the states must look to the Government of India for protection and for channels of communication with external powers, or even with other native states.

British control over the states.

But, as regards the domestic law of British India, the inhabitants of the native or protected states are regarded as foreigners for most purposes, and the writs of the courts of British India do not ordinarily run in the states. Elaborate arrangements for the regulation of jurisdiction have been made, and in certain cases British courts exercise extra-territorial powers within the states.[1] The powers of the rulers of the states vary from complete local autonomy to the exercise of a petty magisterial or small cause court jurisdiction. Sometimes, as in Kāthiāwār, the chief has no jurisdiction at all, and simply possesses the right to collect his share of the 'land revenue' of a village. Control over the states is exercised by either the foreign department of the Government of India or a provincial government, acting through officers of the political service styled agents to the governor-general, residents, political agents, and assistant agents. As a matter of convenience, 'political' powers for dealing with the minor states are often bestowed on the officials of neighbouring British districts or divisions. Many examples of such arrangements will be cited in due course.

[1] The term 'native' as applied to the inhabitants of India is now disliked and regarded as discourteous, the term 'Indian' being usually substituted. But the term 'Native States' has the sanction of such long use of the most formal kind that it is difficult to dispense with it. The term 'Protected States' is coming into favour as an equivalent.

The ruler of a state is expected to pay reasonable deference to the advice of the political officer, who, on his part, is required to abstain from undue interference. The delicate relations between the paramount power and the protected states need to be handled with tact and forbearance. The administration of a few leading states is briefly described in § 3 of this chapter.

§ 2. The Existing System of Administration and Government in British India

The district unit of administration.

The unit of administration in British India is the district, corresponding roughly with the Sarkār of the Mogul system. In British India 258 districts exist. The small provinces of Delhi, Coorg, and the Andaman and Nicobar Islands are not divided into districts. If each of these provinces be counted as a single district the total number will be 261. Many of the native or protected states, as for example the Nizam's dominions or Hyderabad state, follow the British system and make use of the district as the unit of administration.

The size of districts.

Each such district is ordinarily a considerable area, as large as a good-sized English county, and supporting a population of 1,000,000, more or less. In the Madras presidency the districts are exceptionally large. The Vizagapatam district, for instance, has a population of nearly 3,000,000. On the other hand, considerations of administrative convenience occasionally require the formation of exceptionally small districts. Thus, the Simla district has an area of only 102 square miles, and the recently formed Anjengo district of Madras is still smaller. The average area of a district is about 4,430 square miles, and the average population is about 931,000.

The district officer;

Each district is administered by a resident district officer, who is styled magistrate and collector in the older 'regulation' provinces, and usually either deputy commissioner or superintendent in 'non-regulation' territory. The meaning of the terms 'regulation' and 'non-regulation' will be explained presently. In the early

days of the Company's rule, when separate departments did not exist, and the system of administration was crude, the district officer was responsible for everything, like his predecessor the Āmil of Mogul times. Very often he was obliged to direct the operations of military forces. The gradual settlement of the country and the growing differentiation of functions have limited his duties and responsibilities. But still he has plenty to do, and has no reason to complain of want of variety of occupation.

in his executive capacity;

The district officer, in his executive capacity, is the local representative of the provincial or the supreme government, as the case may be, and ultimately of the Crown. When the 'Jubilees' of Queen Victoria were celebrated, each district officer held a Durbar, or solemn assembly, and received on behalf of Her Majesty the homage of the notables of his jurisdiction. Such special ceremonial occasions, of course, are rare, but occasions on which the district officer acts executively on behalf of the government under which he serves directly are frequent.

as chief magistrate;

As chief magistrate, the district officer is responsible for the supervision of the subordinate magistrates, from whom in many cases he is authorized to hear appeals. He possesses considerable original jurisdiction, but rarely has leisure in which to exercise it. One of his principal duties is to maintain peace and order. He is therefore the head of the police of the district, except for purely departmental matters, which are looked after by the officers of the police department. Theorists object to the union of magisterial and executive police functions in one officer, and such a combination would be objectionable in England. The conditions in India are so different that the existing arrangements may be defended successfully for practical reasons.

as collector;

As collector, the district officer is responsible for the collection of the land revenue or Crown rent, as well as for the local administration of stamps, excise, and sundry branches of miscellaneous revenue. He also provides for the charge of the district treasury with the safe custody

of a large stock of cash and stamps. In most provinces the collector and his subordinates exercise judicial powers in certain classes of cases concerning land and rent.

as general superintendent.

Generally speaking, the district officer, both as magistrate and as collector, is expected to keep his eye on the local work of all departments, except those, such as the post office and telegraphs, which are wholly managed by imperial officers. Very few things can happen in a district which are absolutely out of the ken of the officer in charge. His work resembles that of a French préfet, rather than that of any official in England. Such multiplicity of duties necessarily involves the supervision of large establishments, the maintenance of innumerable statistical returns, the writing of endless reports, the conduct of an extensive correspondence, and much travelling.

Internal subdivisions of a district.

Each district is internally divided into sub-districts of convenient area, designated by various names in different parts of the country, and each such sub-district is in the executive charge of an officer who is almost invariably an Indian. In some provinces the ancient Hindu village organization survives and is used to some extent for administrative purposes.

Indispensability of the district officer.

In the system of administration which now exists, and has existed for more than a century, the district officer is the pivot on which the entire machinery turns. It is easy to conceive that the country might go on quite nicely for a considerable time without either a governor-general or a secretary of state, but all the wheels of administrative work would stop running if the district officer were to vanish. For that reason the district and the district officer have been placed in the forefront of this brief exposition of the framework of Indian administration and government.

'Regulation' and 'non-regulation' territory.

Whether a province or district be technically 'regulation' or 'non-regulation', the functions of a district officer are essentially the same, although in the 'non-regulation' tracts he is vested with more extensive magisterial powers, and in the wilder parts of the country

is necessarily freed from certain legal formalities. Previous to 1833 the legislative enactments of the Government of India were styled regulations, and the provinces in which the regulations as a whole were in force were consequently known as 'Regulation Provinces', namely, Bengal with Bihār, Bombay, Madras, and the Western Provinces, now the Agra Province. As the boundaries of the empire advanced, it was found impossible to apply the whole of the ordinary law to newly annexed territories, which accordingly were designated as 'non-regulation' provinces, and administered with more elasticity than the older British possessions. In such provinces the governing staff at first always included many military officers, but as time passed and the reign of law and order became consolidated, the necessity for semi-military occupation ceased, and the tendency of the administration was towards the system pursued in the older provinces, as regarded both men and measures. For example, the 'non-regulation' Punjab, annexed in 1849, is now for the most part governed in much the same way as the adjacent 'regulation' United Provinces. But a region like Upper Burma or the greater part of the North-West Frontier Province, cannot be subjected fully to the ordinary law of British India at present, nor is there any prospect that either of those regions will be so subjected for many a day.

Scheduled districts.

Provinces, which as a whole are fully under the authority of the ordinary law and the regular courts, frequently include particular districts in which special treatment is indispensable. Districts of that kind are the Santāl Parganas attached to Bihār, the Chittagong Hill Tracts attached to Bengal, and many others, as enumerated under each province in § 3 of this chapter. Such districts are often spoken of as scheduled districts, with reference to the Scheduled Districts Act of 1874, which empowers the Government of India to declare in case of doubt the law in force in certain districts, and to extend to them, with or without modification, any enactment in force elsewhere in British India. The

governor-general-in-council also possesses, under the Government of India Act of 1870, more extensive powers to make regulations having the force of law in any territories to which the Act may have been applied by the secretary of state. Most of the special regulations in force in Assam, the Andaman Islands, Aden, and other regions of an exceptional kind are passed by the Government of India in its executive capacity under the Act of 1870.

Thus, nowadays, the real distinction is that between territories for which the Government of India can legislate by executive action, and those in which laws must be passed by a legislative council, either imperial or provincial. The old term 'non-regulation' may be conveniently used with a slight change of meaning to signify the territories in which legislation by executive power is permitted.

Divisions and commissioners.

In all the larger provinces, except Madras, districts are grouped in divisions, each containing from three to seven districts. The officer in charge of such a group is called a commissioner of division, or simply commissioner. His business is to exercise a general supervision over the working of his district officers, and to be the channel of communication between them and superior authority. He exercises that supervision by means of personal communication, correspondence, and tours of inspection. If he is a judicious man he will abstain from fussy interference and will sedulously avoid doing other people's work. The commissioners of divisions, first established by Lord William Cavendish-Bentinck in 1829, are in the nature of a fifth wheel to the coach, and not indispensable, as Madras has proved. But their existence is a convenience to the provincial government, and the institution, if worked in a sensible spirit, has its uses. A wise commissioner can often help his subordinates, especially those of least experience, by friendly counsel.

Boards of revenue.

The provincial government of all the more considerable provinces is assisted by a special authority at headquarters for the control of the important revenue depart-

ments. That authority in the older large provinces is a board of revenue, with two or more members. In other territories the work is done by a single officer, styled financial commissioner.

Provincial or local governments.

The highest authority in a province, subject only to the control of the Government of India or supreme government, is the provincial or local government. The provinces of British India being 15 in number, and varying in area from the 557 square miles of Delhi to the 237,000 square miles of Burma, the constitution of the various local governments necessarily varies within wide limits.

Chief commissioners.

In the smaller provinces, such as Delhi and Coorg, the government consists of a chief commissioner, who is supported at head-quarters by a small secretariat and a few departmental heads, each of whom usually undertakes multifarious duties.

The governments of certain considerable provinces, like Assam and the Central Provinces, also consist each of a chief commissioner, but his staff is larger, and the organization of departments is more elaborate. The chief commissioner of the Central Provinces probably will be supplied with a legislative council before long, and may develop into a lieutenant-governor-in-council.

Lieutenant-governors.

Four provinces are ruled by lieutenant-governors, namely, Bihār and Orissa, the United Provinces of Agra and Oudh, the Punjab, and Burma. Each lieutenant-governor has a legislative council. The Councils Act of 1909 has greatly enlarged the membership and powers of lieutenant-governors' legislative councils, and has authorized the creation of executive councils. Such a council was constituted for the Province of Bihār and Orissa on August 1, 1912; and there is little doubt that before very long the other lieutenant-governors also will be provided with executive councils.

The powers of a lieutenant-governor do not differ substantially from those of a chief commissioner, but he enjoys higher rank and pay, and his appointment requires the sanction of the Crown. Chief commissioners are

appointed by the governor-general-in-council of his own authority.

The highest form of provincial or local government is that of a governor-in-council, which exists in Madras, Bombay, and Bengal. Governors in council.

The governors of Madras and Bombay are the lineal descendants of the heads of the East India Company's 'factories' at those places, who were styled presidents in earlier and governors in later times. The governorship of Fort William or Bengal was merged in the office of governor-general by the Regulating Act in 1774, and so continued for eighty years until 1854, when a separate lieutenant-governor of Bengal was appointed. The governor of Bengal as now existing dates only from 1912.

The heads of the administration in Madras and Bombay, whether called presidents or governors, were always assisted by executive councils. For many years in recent times the executive councils at Madras and Bombay consisted of two members each. Under the Councils Act of 1909 the number of members in each has been raised to three. In November 1910 the lieutenant-governor of Bengal accepted the assistance of an executive council of three members under the Act of 1909. When he was replaced by a governor, the council, of course, continued to exist.

A governor is vested with the power of overruling his council in any case which he judges to be of high importance, essentially affecting the public interest and welfare, and is bound to record his reasons for so doing. Similar powers were conferred on the governor-general in 1786. The necessity for them had been demonstrated by the painful experience of Warren Hastings. A governor enjoys the title of excellency, is provided with a body-guard, draws pay higher than that of a lieutenant-governor, and has the privilege of direct correspondence with the secretary of state. Chief commissioners and lieutenant-governors are appointed from the ranks of the Civil Service of India. A member of that service may be, and occasionally is, appointed a governor, but, as a rule,

the governors are noblemen or other persons of distinction not belonging to any of the Indian services.

The governor-general-in-council.

The control of the entire Indian Empire, comprising British India, native or protected states, and dependencies of various kinds, is in the hands of the governor-general-in-council. The governor-general is an evolution from the Governor of Fort William, and from 1774 to 1834 was styled Governor-General *of Fort William in Bengal*. In 1834 he became Governor-General *of India*, and on November 1, 1858, he received the additional title of Viceroy in the Proclamation of Queen Victoria, whereby she declared Viscount Canning to be her 'first Viceroy and Governor-General'. Since that time the new title has come into general popular use, but the statute books of both the United Kingdom and India know nothing of a viceroy. Legal authority is vested in the governor-general-in-council.

The council of the governor-general.

The number of members of the governor-general's council has varied from time to time since 1774. In the year 1913 there were seven members, namely, the commander-in-chief, in charge of the army department, and six other members, in charge respectively of the finance, revenue, education, legislative, commerce and railways, and home departments. Those members are selected partly from the Civil Service of India, and partly from other sources. In 1913 the member in charge of the legislative department was an Indian Muhammadan lawyer.[1]

No member of council is assigned charge of the foreign department, which remains in the hands of the governor-general in person. That department deals with the native or protected states, as well as with foreign business strictly so called, and is served by a special organization known as the political department, which includes many military officers.

[1] The commander-in-chief is still technically an 'extraordinary' member of council, but is entitled to vote on any subject. Only matters of special importance are brought before the council as a whole, ordinary departmental business being disposed of by the member in charge.

The home government.

The governor-general-in-council is not an independent potentate. He is a servant of the king, and, consequently, must be prepared to accept orders lawfully passed by the king's ministers. In the purely commercial days of the East India Company, the control from home of the factories in India necessarily rested with the directors and proprietors of the company. The Regulating Act of 1773, under which Warren Hastings was appointed first governor-general in 1774, made little provision for the home government. The existing form of that government, as reconstituted in 1858, is based on Pitt's India Act of 1784, modified by subsequent legislation and the exercise of the royal prerogative. The secretary of state for India replaces the president of the board of control (who from 1841 was the only member of the so-called board), and the council of India, which advises him, performs many of the functions of the court of directors, especially those of the secret committee of that court, which for many years had exercised all real power.

The supreme authority of the imperial parliament is secured by the parliamentary responsibility of the secretary of state, but Indian finance being separate, the estimates for India do not require the sanction of the House of Commons. Parliament rarely legislates directly for India.

The council of India consists of from ten to fifteen members appointed for a term of years by the secretary of state and selected usually for their eminence as experts in Indian affairs. The secretary of state enjoys extensive powers enabling him to act independently of the council, excepting in measures imposing a charge on the Indian revenues, for which the assent of the council is indispensable.

Machinery for legislation.

Having thus traced in outline the existing system of executive government and administration, from the district (with its internal subdivisions) upwards to the crown and imperial parliament, we turn to examine the machinery for legislation.

Until the middle of the nineteenth century, when Lord Dalhousie added members for legislative purposes only to the governor-general's council, no special legislative machinery existed. One legal member of the executive council, it is true, had been already appointed under the Act of 1833, but no legislative council existed before Lord Dalhousie's time. Successive Acts of parliament, culminating in the Councils Act of 1909, have enlarged the numbers and powers of the governor-general's legislative council, and established similar councils in the provinces ruled by governors and lieutenant-governors. The details are too complex to admit of summary exposition. It may suffice to note that the governor-general's or imperial legislative council has been increased from 21 to a maximum of 60 members; that the five provincial councils existing in 1911 have been similarly enlarged, so that the total maximum strength is 370 members, as against 139 under the old law; and that 135 members are now to be elected by various bodies, chambers of commerce and so forth, as against 39 under the Act of 1892.

Representation of minorities: non-official members.

Elaborate arrangements, varying in each province, have been made for securing the due representation of minorities in the population, particularly of the Muhammadans in most provinces, and also of special interests, such as the tea industry in Assam and the planter communities in Bihār.

In the imperial council an official majority is secured by the Act, but in the provincial councils that safeguard has been deemed superfluous, reliance being placed on the control exercised by the supreme government.

The rules of procedure and debate have been largely modified so as to increase the privileges of non-official members, who may now, under certain conditions, introduce resolutions or bills, put questions to the executive, and debate matters of public policy, especially the earlier stages of the budget, with considerable freedom.

It is obvious that no finality has been attained in the development of the legislative councils, and that further changes may be expected in the course of time.

Judicial administration.

The judicial administration, like that in other departments, is based on the district unit.

Each district is supplied with a sufficient number of magistrates of subordinate grades, with varying powers, all under the general control of the district magistrate. Nearly every district has a sessions judge, to whom serious cases are committed for trial.[1] He has unlimited jurisdiction, save that capital sentences require the confirmation of the highest provincial judicial authority.

The civil courts are graded in a similar way. The lowest grade is that of munsif, and each district usually has a subordinate judge. The sessions judge ordinarily also possesses power to decide civil cases without limit as district judge. Each province has a supreme judicial authority, which, in the larger and older provinces, is a chartered high court, with judges appointed by the Crown. The Punjab and Burma have each a chief court, with judges appointed by the governor-general in council. Smaller provinces are content with a judicial commissioner, who may be either single-handed or have colleagues.

Great liberty of appeal is allowed in both civil and criminal cases. The superior courts also make free use of their extensive powers of revision.

Final appeals to the King's Privy Council (Judicial Committee) are permitted on certain conditions. Appeals to the judicial committee in criminal matters are rare.

The law of procedure, both criminal and civil, has been minutely codified, and most branches of substantive law also, including penal and contract law, have been reduced to the form of codes. The penal code is universally admired.

Army.

Although the subject of army organization is too complex and technical for detailed description in this place, no survey of the system of Indian administration can be considered complete without some notice of the protecting armed forces on which the existence of society

[1] Sometimes two or more districts have but one civil and sessions judge. A few assistant judges exist.

depends. The special problems of Indian defence are dealt with elsewhere.

The commander-in-chief, who is a member of the governor-general's executive council, is both war minister and commander-in-chief. He is thus the responsible head of the army in all departments, executive or administrative. For purposes of administration he is provided with a departmental staff, adjutant-general, quarter-master-general, &c. For executive purposes the army is divided into three great commands, namely, the Northern, Bengal, and Bombay, each under a lieutenant-general. Each command is subdivided into districts. The troops at Secunderabad in the Nizam's Dominions and in Burma are directly under the orders of the commander-in-chief.

The army consists of regular troops and auxiliary forces. The strength in February 1913 is shown in the following statement:

REGULAR FORCES IN INDIA

Establishments, 1912-13	
British Troops	75,886
Indian Troops (including British officers and men employed with Indian Army and Indian Army Departments)	163,403

RESERVES AND AUXILIARY FORCES

Actual Strength, Dec. 1, 1912.	
Volunteer Forces	41,748
Volunteer Reserves	3,069
Imperial Service Troops	23,245
Border Military Police (Militia and Levies)	14,341
Military Police	20,728
Reservists (Indian Army)	32,695

The native or protected states maintain armies of their own, comprising about 93,000 men, mostly of slight military value.

Navy. The Indian Navy was abolished in 1862, since which date the Indian Empire depends on the Admiralty for naval protection. The Royal Indian Marine is a small organization controlling the Bombay and Calcutta dock-yards, besides about eleven sea-going vessels, namely, troopships, surveying vessels, and a dispatch boat, with some smaller craft. The armament is weak.

The Civil Service of India, commonly called the Indian Civil Service, is the descendant of the commercial staff of merchants, factors, and writers employed by the East India Company, and reorganized as an administrative body by Lord Cornwallis in 1793.[1] An Act of parliament (the Charter Act) passed in that year secured to the service the exclusive right to all the desirable civil appointments below the rank of member of council in the regulation provinces. The rights of the service were confirmed by an Act of 1861, and modified by an Act of 1870 which threw open the reserved appointments under certain conditions to natives of India of proved merit and ability. Since 1855 admission to the service has been obtainable only by open competition. All natural-born subjects of the king are eligible to compete, and a certain number of Indian candidates gain admission by competition. The relaxation of the statutory privileges of the regular civil service has thrown open in practice to other Indians about a hundred appointments formerly reserved. The Civil Service of India is maintained as a small body (about 1,300 in 1913) of highly educated and specially trained officers, destined to fill the higher administrative and judicial offices (subject to the exception above noted), with a strength sufficient to give its members training in subordinate posts. Important changes in the organization of the service seem to be probable.

The Civil Service of India.

The great defect of the arrangements made by Lord Cornwallis was the almost complete exclusion of the natives of the country from offices of profit and responsibility. A burden which could not be properly borne

Development of employment of Indians.

[1] The name 'Civil Service of India' is that used in the Acts of parliament, but the term Indian Civil Service and the abbreviation I.C.S. have come into common use, because the letters C.S.I. designate a Companion of the Order of the Star of India. The term 'Covenanted', formerly applied to the Civil Service of India because the members are required to sign covenants binding them not to trade, receive presents, and so forth, has become obsolete, as has the corresponding term 'Uncovenanted', applied to members of departmental civil services, like the Public Works, Post Office, Telegraphs, &c.

was placed upon the shoulders of a numerically inadequate European close service, and a real grievance was inflicted upon men of Indian birth. Gradual changes have remedied that defect, and now there is no office, save that of governor-general, to which an Indian may not aspire. A Muhammadan gentleman sits (1913) as legislative member of the governor-general's executive council, and is thus admitted to a share in the innermost secrets of the state. Two Indian members are among the advisers of the secretary of state in the Council of India, and every high court includes judges selected from the Indian bar. The civil judicial administration, except for the small number of judges recruited from the Civil Service of India, is wholly in the hands of Indians, who supply all the munsifs and subordinate judges. The executive administration, also, in all its lower grades, is entirely worked by Indians, and the tendency is to increase the Indian element in the higher grades. The problem is to reconcile the just claims of the Indians with the imperious necessity of maintaining the British political supremacy and the conduct of the government on principles approved by the British nation.

Growth of specialized departments.

Before Lord Dalhousie's time, in the middle of the nineteenth century, departmental organization hardly had begun to exist. The few members of the Covenanted Civil Service, as it was then called, had to look after everything, with the help of ill-trained and ill-paid Indian subordinates. Since Lord Dalhousie's days, and especially since the assumption by the Crown of the direct government of India in 1858, the machinery of a civilized, organized government has been introduced bit by bit, until a vast network of specialized civil departments, education, public works, post office, and so forth, has been created. The members of those departments, although 'civil servants' in the English sense of the term, are not members of the Civil Service of India, popularly known as the Indian Civil Service. The departments are freely open to qualified Indian candidates.

§ 3. The Provinces and States

A.—*Provinces of Northern India, with the dependent Native States.*

I. Bengal.
II. Assam.
III. Bihār (Behar) and Orissa.
IV. The United Provinces of Agra and Oudh.
V. Ajmēr-Mērwāra.
VI. The Panjāb (Punjab).
VII. Delhi.
VIII. The North-West Frontier Province.

I. *Bengal*

Formation of the province.

Bengal, as constituted in 1912, has been demarcated so as to include the majority of the people speaking the Bengali language, and is nearly coincident with the *Sūba* of Bengal in Akbar's time. It is a portion of the much larger province of Bengal, which existed until 1905. The distinction then drawn between Bengal and Eastern Bengal was quashed in December 1911, by the command of the king-emperor proclaimed at Delhi (see the article on Bihār and Orissa).

Districts and divisions.

The province, in its present form, comprises 27 districts grouped in five commissioners' charges or divisions, as follows:

I. *Presidency Division*: (1) Twenty-four Parganas, (2) Calcutta, (3) Nadia (Nūdiyā), (4) Murshīdabad, (5) Jessore, (6) Khulna.

II. *Burdwān Division*: (7) Burdwān, (8) Bīrbhūm, (9) Bānkura, (10) Midnapore, (11) Hooghly, (12) Howrah.

III. *Dacca Division*: (13) Dacca, (14) Mymensingh, (15) Farīdpur, (16) Bākarganj.

IV. *Chittagong Division*: (17) Tippera, (18) Noakhāli, (19) Chittagong, (20) Chittagong Hill Tracts.

V. *Rājshāhi Division*: (21) Rājshāhi, (22) Dinājpur, (23) Jalpaiguri, (24) Mālda, (25) Rangpur, (26) Pabna, (27) Bogra (Bagrahā).[1]

Capital.

Calcutta, replaced by Delhi as the official capital of the Indian Empire from October 1, 1912, continues to be

[1] Divisions III, IV, V, were in Eastern Bengal from 1905 to 1912.

the capital of the Governor of Bengal. But Dacca, the capital of Eastern Bengal from 1905 to 1912, has been provided with all the conveniences of ordinary provincial head-quarters, and will be used as a secondary capital of the new province, at which the governor will reside for about three months in the year.

Councils.

The ruler of the province is now a governor-in-council, as in Madras and Bombay. Before the change made in his rank, the Lieutenant-Governor of Bengal had accepted the aid of an executive council under the provisions of the Councils Act of 1909. Three councillors have been appointed, but the number may be raised to four. The legislative council, in existence since 1862, has been enlarged under the legislation of 1909. The supreme judicial authority (except in Chittagong Hill Tracts) is the high court at Calcutta. In the greater part of the province the land is held under the 'Permanent Settlement of 1793'.

High Court and permanent settlement.

One 'non-regulation' district.

The province possesses only one 'non-regulation' district, namely, the Chittagong Hill Tracts, a wild frontier country situated between the Tippera state and the Arakan frontier. The district officer, styled superintendent, is guided by simple rules framed under Regulation I of 1900. The commissioner of the Chittagong division exercises for the district the powers of a sessions judge and also of a high court, except that capital sentences require the confirmation of the governor-in-council.

Native states.

Only two native states—Cooch Behar (Kūch Bihār) and Hill Tippera, are attached to Bengal. The former state, lying to the south of the Jalpaiguri district, has been a dependency of Bengal since 1773. It is well administered by the highly educated maharāja, who is assisted by a British superintendent.

The Rāja of Hill Tippera, a wild and backward region, is controlled by the district officer of Tippera, who is *ex-officio* political agent.

II. *Assam*

Formation of the province.

The frontier province of Assam, corresponding roughly with the ancient kingdom of Kāmarūpa, was occupied by the Burmese from 1817–26, and was ceded in the latter year to the East India Company under the provisions of the Treaty of Yandaboo, at the close of the first Burmese war. The province was administered as part of Bengal until 1874, when it was organized as a minor separate province under a chief commissioner responsible to the Government of India. That arrangement held good until 1905, when Lord Curzon reunited Assam with his new province of Eastern Bengal. In 1912, after the Imperial Durbar at Delhi, the chief commissionership was revived, and Eastern Bengal conjoined with the western districts. The control exercised by the Government of India over the politics of the north-eastern frontier is facilitated by the existence of the chief commissionership.

System of administration.

The province comprises 12 districts, each administered on ' non-regulation ' principles by a deputy commissioner. The superior staff includes military officers as well as members of the Civil Service of India. The six districts in the Assam Valley have been grouped in a division under a commissioner,[1] but in the other six districts no authority intervenes between the district officer and the head of the government.[2] General control over judicial work is exercised by the high court of Calcutta.

The capital is Shillong.

Native state.

The hill state of Manipur is controlled by a political agent or assistant agent acting under the orders of the chief commissioner.

III. *Bihār (Behar) and Orissa*

Formation of the province.

Until 1834 the Bengal Provinces comprised Bengal, Bihār, and part of Orissa, as acquired in the years 1757–65; Benares (1775); the ceded provinces given up by Oudh

[1] 1. Goālpāra; 2. Kāmrūp; 3. Darrang; 4. Nowgong; 5. Sibsāgar; 6. Lakhimpur.

[2] 7. Sylhet and 8. Cāchār (in Surmā Valley); 9. Lushai Hills; 10. Nāga Hills; 11. Khāsia and Jaintia Hills; 12. Garo Hills.

in 1801; the conquered provinces between the Jumna and Ganges, with Bundelkhand and Cuttack, all annexed in 1803; the Saugor and Nerbudda Territories (see Central Provinces), ceded by the Marāthas in 1817 and 1818; and Assam with Arakan (1826). That vast and unmanageable area was governed, in a fashion, from Calcutta, either by the governor-general in person, or by the deputy governor-general—that is to say, the senior member of council for the time being.

In 1834 the 'Upper' or 'Western Provinces' were constituted a separate local government, at first under a governor, and then (1836) under a lieutenant-governor, and styled the North-Western Provinces, comprising Benares with the ceded and conquered provinces, to which the Saugor and Nerbudda Territories were attached at times. The North-Western Provinces are now merged in the United Provinces of Agra and Oudh (which see).

The remaining 'Lower Provinces' of Bengal, Bihār, and Orissa did not obtain a lieutenant-governor of their own until 1854. Assam, when annexed in 1826, had been added to Bengal, which also included Arakan from 1826 to 1862 (see Burma). In 1874 Assam was constituted a separate chief commissionership, but the relief thus given to the overweighted lieutenant-governor of Bengal was inadequate.

In order to relieve the congestion of business the arrangement known as the Partition of Bengal was effected in 1905, so that Eastern Bengal, to which Assam was reunited, made one province, while the rest of Bengal, with Bihār, Chutia Nāgpur, and Orissa made another. That arrangement lasted until 1912, when the orders passed by the king-emperor at the Delhi Durbar of 1911 took effect. The result is that the chief commissionership of Assam has been restored, Bengal proper has become a compact province under a governor-in-council, while Bihār, Chutia Nāgpur, and Orissa constitute a new province under a lieutenant-governor, with its capital at Patna. The official name of the province is 'Bihār and Orissa'.

It will be convenient to treat separately each of the three constituent sub-provinces.

(*a*) *The sub-province of Bihār* (*Behar*)

Extent, districts, and divisions of Bihār.

The modern Bihār is more extensive than the Mogul *Sūba* of the same name, because it includes the Purnea (Puraniya) district, which was in the *Sūba* of Bengal, and the Darjiling and Santāl Parganas districts, which were never in effective Muhammadan occupation, and have no historical connexion with Bihār. The natural geographical division of Bihār proper would be into north and south—that is to say, to the north and south of the Ganges. But the facts of nature have been ignored in fixing administrative boundaries.

The sub-province comprises 12 districts, grouped in two divisions, or commissioners' charges, both of which extend across the river, as follows:

I. *Patna division*: (1) Patna, (2) Shahabad and (3) Gaya, to the south of the Ganges, (4) Sāran, (5) Champāran, (6) Muzaffarpur and (7) Darbhanga, to the north of the river, and all included in Bihār proper.

II. *Bhāgalpur division*: (1) Purnea (Puraniya) and (2) Darjeeling, wholly to the north of the river, (3) Monghyr (Mungir) and (4) Santāl Parganas, wholly to the south of the stream, and (5) Bhāgalpur, on both sides of it. Monghyr and Bhāgalpur form part of Bihār proper.

'Non-regulation' districts.

Two 'non-regulation' districts, administered by deputy commissioners, form part of the Bhāgalpur division, and so of the sub-province of Bihār, with which they have no natural connexion. The first of these, Darjeeling, a Himalayan and sub-Himalayan region, is the result of successive annexations from the Sikkim state, effected between 1816 and 1865. The second, the 'Santāl Parganas', a rough, hill country, inhabited by Santāls, and other half-civilized tribes, resembles Chutia Nāgpur (which see). It was constituted a separate district in 1855, and is governed under the provisions of Regulation III of 1872.

(b) *The sub-province of Chutia (Chota) Nāgpur*

Formation of the division or sub-province.

Chutia Nāgpur, an upland wild region, lying to the south-west of Bengal, and mainly inhabited by Kōls and similar uncivilized tribes, is now organized as a commissioner's charge or division, with head-quarters at Rānchī, comprising five districts, namely, (1) Hazāribagh, (2) Rānchī, (3) Palāmau, (4) Mānbhūm, and (5) Singbhūm. Previous to 1833 the area formed part of an immense district called Rāmgarh, which was then broken up. The balance of the territory in that district was assigned to the Gayā and Monghyr districts of Bihār.

Native states.

Until October 1905, nine native states were attached to the Chutia Nāgpur division, but at that date seven of those states (namely, Chāng Bhakār, Koreā, Surgujā, Udaipur, Jashpur, Gāngpur, and Bonai), were transferred to the Central Provinces (which see). Only two feudatory states, Kharsawān and Saraikela, lying between the Mānbhūm and Singbhūm districts, remain dependent on Chutia Nāgpur. The *sanads* or grants bestowed in 1899 give to the deputy commissioner of Singbhūm and the commissioner of the division practically unlimited powers of interference in the internal affairs of both states.

Administration.

The Kōl rebellion of 1832 having demonstrated the oppressive cruelty of applying the Bengal code to a region inhabited by semi-savage tribes, Chutia Nāgpur was removed from the operations of the general law by Regulation XIII of 1833, and provided with an elastic, 'non-regulation' form of administration, controlled by an officer styled 'Agent to the Governor-General, South-West Frontier'. In 1854 the agency was reorganized as a 'non-regulation' division or commissioner's charge. The district officers are called deputy commissioners.

(c) *The sub-province of Orissa*

Formation of the division or sub-province.

In 1765, when Clive obtained from the titular emperor of Delhi the grant of the 'Diwānī', or revenue administration of Bengal, Bihār, and Orissa, the only portion of Orissa in respect of which the grant took effect was the

Midnapore district and part of Hooghly. The rest of the country, known as Cuttack, having been conquered from the Marāthas in 1803, was divided in 1828 into three districts (Cuttack (Katak), Balasore, and Puri). Angul, a wild tract, mostly inhabited by Khonds, and formerly attached to Cuttack, was constituted a separate district in 1891.

The Sambhalpur district (with some modification of area) was transferred to Orissa from the Central Provinces (which see) in 1905.

Thus the sub-province now consists of the five districts named, organized as a division under a commissioner.

Tributary states.

Twenty-four tributary states, occupying wild and imperfectly explored country watered by the Mahānadī, Brāhmanī, and Baitaranī Rivers, are attached to the division. The internal affairs of those states are managed by the chiefs, who hold under *sanads* or grants executed in 1894. Supervision, including certain judicial action, is exercised by a political agent under the control of the commissioner.

The largest and most important of the tributary states is the most northerly, Mayūrbhanj. The late Rāja, who died in 1911, did much to improve his administration.

Administration of the province as a whole.

The head of the local government is the lieutenant-governor, who was given a legislative council on April 1, and an executive council on August 1, 1912. In Bihār proper the districts are all 'regulation', and the land is held generally under the permanent settlement of 1793. The districts of Darjiling and the Santāl Parganas attached to Bihār, and also the sub-province of Chutia Nāgpur are 'non-regulation' and not subject to the permanent settlement. The Angul district in Orissa is administered by a deputy commissioner under a special regulation (I of 1894).

The high court of Calcutta is the highest judicial authority in all the 'regulation' districts. The wilder tracts above mentioned are supplied with a simpler judicial system suited to their needs, under the provisions of sundry special enactments.

IV. *The United Provinces of Agra and Oudh*

Formation of the province.

The territory now known as the United Provinces of Agra and Oudh has been built up by a long series of annexations, conquests, and adjustments affected with little regard to natural boundaries or ancient divisions.

In 1775 the Nawāb-Vizier of Oudh ceded the sovereignty of the Ghāzīpur and Benares territories, which came gradually under complete British administration after Rāja Chait Singh's rebellion in 1781. Rohilkhand had been annexed by the Oudh state in 1774 with the help of Warren Hastings. In 1801 Lord Wellesley compelled the Nawāb-Vizier to cede a large portion of his dominions, comprising the present Gorakhpur division, most of the Rohilkhand division (excluding the Rāmpur state), and sundry districts between the Ganges and Jumna. All those districts became known collectively as the ceded provinces or districts. Oudh was thus surrounded by British territory except on the north, where the state abutted on Nepāl. The Nawāb-Vizier of Oudh was permitted to assume the title of king in 1819.

The Bundelkhand districts were taken from the Marāthas in 1803 by a detached force, and the districts to the west of the Jumna, including the Delhi territory, were conquered in the same year by Lord Lake. All those districts became known collectively as the conquered provinces.[1] The Himalayan and sub-Himalayan tracts were mostly acquired at the close of the Nepalan war in 1816, but the boundaries have been modified in detail at later dates. Until 1831 all the territories so acquired remained under the control of the government and courts of Bengal, but in that year separate courts of justice were set up for the western provinces. Three years later Sir Charles Metcalfe was appointed governor of those provinces (exclusive of Oudh and part of Bundelkhand), under the provisions of the statute 3 & 4 William IV, c. 85. That arrangement, however, never took full

[1] The Delhi territory continued to be administered in the name of the titular emperor until 1832, when it was incorporated in the British dominions.

effect, and in 1836 a lieutenant-governor was appointed to the charge of the same area, which was designated the North-Western Provinces, a name appropriate then, when the Panjāb had not yet been annexed. The Saugor and Nerbudda Territories (see Central Provinces) were attached to the North-Western Provinces from 1836 to 1842 and again from 1853 to 1861.

In 1856 the kingdom of Oudh was annexed and constituted a separate minor 'non-regulation' province under a chief commissioner responsible to the Government of India. That arrangement continued until 1877 when the lieutenant-governor of the North-Western Provinces was appointed *ex officio* chief commissioner of Oudh. In 1902, after the formation of the North-West Frontier Province, it was impossible to retain the designation of North-Western Provinces, which had been unsuitable ever since the annexation of the Panjāb in 1849. Those provinces accordingly became the Agra Province, and the head of the government was styled lieutenant-governor of the United Provinces of Agra and Oudh, the title of chief commissioner being dropped.

Separate administration of Oudh.

The administration of Oudh has always been and continues to be distinct to a large extent from that of the Agra province. The district officers in Oudh retain the 'non-regulation' title of deputy commissioner, and are vested with criminal jurisdiction higher than that possessed by the district magistrates of 'regulation' districts. Oudh is not subject to the high court of Allahabad, the court of the judicial commissioner at Lucknow being invested with the powers of a high court.[1] The land laws of the two provinces also differ materially.

Capitals.

Allahabad is the official capital of the United Provinces, but Lucknow, the royal city of Oudh, is treated as a secondary capital, the lieutenant-governor residing there part of the year. In the hot weather the government is quartered at Naini Tāl in Kumaon.

High court.

The high court of Allahabad is an independent

[1] The judicial commissioner has two colleagues, styled additional judicial commissioners.

chartered high court, with jurisdiction over the Agra province.

Executive and legislative councils.

Under the Councils Act of 1909 the lieutenant-governor probably will be provided with an executive council, as in the other major provinces. A legislative council has existed since 1886, and has been enlarged under the Councils Act 1909.

Non-regulation districts.

The hill division of Kumaon is 'non-regulation', the district officers being styled deputy commissioners. The Dehra Dūn district also is 'non-regulation', the district officer being styled superintendent. The rest of the Agra province is 'regulation'.

Divisions and districts.

Agra Province. The Agra province is organized in 36 districts forming 8 divisions or commissioner's charges, and Oudh in 12 districts forming 2 divisions, as follows:

I. *Allahabad division*: (1) Cawnpore, (2) Fatehpur, (3) Allahabad, (4) Etawah, (5) Farrukhabad.

II. *Agra division*: (6) Muttra (Mathurā), (7) Agra, (8) Mainpuri, (9) Etah, (10) Aligarh.

III. *Meerut division*: (11) Dehra Dūn, (12) Sahāranpur, (13) Muzaffarnagar, (14) Meerut, (15) Bulandshahr.

IV. *Bareilly division*: (16) Bareilly, (17) Bijnōr, (18) Budaun, (19) Morādabad, (20) Shahjahanpur, (21) Pīlibhit.

V. *Benares division*: (22) Benares, (23) Mirzāpur, (24) Jaunpur, (25) Ghāzīpur, (26) Balliā.

VI. *Gorakhpur division*: (27) Gorakhpur, (28) Bastī, (29) Azamgarh.

VII. *Kumaun division*: (30) Naini Tāl, (31) Almora, (32) Garhwāl.

VIII. *Jhānsī division*: (33) Jhānsī, (34) Jalaun, (35) Hamīrpur, (36) Bānda.

Oudh

I. *Lucknow division*: (37) Lucknow, (38) Unāo, (39) Rāe Barēli, (40) Sītapur, (41) Hardoī, (42) Kherī.

II. *Fyzabad division*: (43) Fyzabad, (44) Gonda, (45) Bahraich, (46) Sultānpur, (47) Partābgarh, (48) Bāra Bankī.

The permanent settlement of 1793 is in force in the greater part of the Benares division. In the rest of the Agra province the revenue 'settlements' are usually made with village zemindars for a term of either twenty or thirty years. The land system of Oudh is peculiar. Revenue 'settlements'.

(1) The Rāmpur state, enclosed in the area of the Bareilly district, was formed in 1774 after the Rohilla war of Warren Hastings. The Nawāb has full administrative and judicial powers. The commissioner of Rohilkhand (Bareilly) is *ex officio* political agent. Native states.

(2) The hill state of Tehrī is governed by a Rāja. The commissioner of Kumaon is political agent.

(3) The Mahārāja of Benares, who had always retained a certain amount of jurisdiction in his family domains, was raised to the status of a ruling prince by Lord Minto in 1911. The commissioner of Benares is the political agent for supervising the administration of the state.

V. *Ajmēr-Mērwāra*

This small 'non-regulation' province, lying on the watershed of the Ārāvali range between the Rājpūt states of Udaipur or Mewār and Jodhpur or Mārwār, is no larger than one of the more considerable districts in the 'regulation' provinces, such as Bastī in the United Provinces, and is much smaller than some such districts. Formation of the province.

It consists of two districts—Ajmēr (Ajmīr, Ajmere), and Mērwāra (Mairwara). Ajmēr was acquired in June 1818 by treaty with Daulat Rāo Sindia, who was in possession. Mērwāra, a wild hilly tract, then inhabited by outlaws and robber clans, was imperfectly controlled by various authorities until 1842, when it was united with Ajmēr. It is held under treaties made in 1823 and 1824 with the Rājas of Udaipur and Jodhpur, who retain certain nominal rights, but 'the whole district is now, to all intents and purposes, British territory', and has been reduced to order long ago.

Each of the two districts is governed by an assistant commissioner with the powers of a district magistrate, Administration.

acting under the control of the agent to the governor-general for Rājputāna, who is *ex officio* chief commissioner, and subject to the orders of the foreign department of the Government of India. The chief commissioner 'performs the functions of a chief revenue authority, being also the highest court of appeal, both civil and criminal'.

The capital of the province is Ajmēr. Beāwar or Nayānagar is the head-quarters of Mērwāra. The land tenures are peculiar. The finances are directly controlled by the Government of India, which enacts any legislation required by means of regulations passed by the executive council.

VI. *The Panjāb (Punjab)*

Formation of the province.

The province as it now exists is considerably more extensive than the Panjāb proper, the 'land of the five rivers', namely, the Jhelum, Chenāb, Rāvi, Biās, and Sutlej, and is not exactly equivalent to any Mogul province or sub-province. The greater part of the area was annexed in 1849, at the close of the second Sikh war.

The Delhi territory, nearly equivalent to the modern Delhi division, conquered in 1803, was gradually brought under British administration, and was administered as part of the western districts of Bengal until 1834 when it was attached to the governorship of the North-Western Provinces, which was reduced to a lieutenant-governorship in 1836. After the Mutiny, the territory, with some rectification of boundaries, was transferred to the Panjāb. Since October 1, 1912, Delhi, now the official capital of the Indian Empire, with a small area on the north, west, and south of the city, has been formed into a minor province under a chief commissioner directly responsible to the Government of India (see Delhi province). Minor alterations of provincial boundaries, chiefly in the neighbourhood of Simla, need not be detailed.

Capital.

The capital is Lahore. During the hot season the government resides at Simla, which, although the seat

of the imperial government for fully half the year, is still included within the borders of the Panjāb.

The province contains 27 districts, grouped in 5 divisions or commissioners' charges, as follows: Divisions and districts.

I. *Ambāla* (*Umballa*) *division*: (1) Hissar, (2) Rohtak, (3) Karnāl, (4) Umballa (Ambāla), (5) Simla, with (6) Rohtak, and (7) Gurgaon, as those districts have been reconstituted in consequence of the creation of the Delhi province (which see).

II. *Lahore division*: (7) Lahore, (8) Montgomery, (9) Amritsar (Umritsur), (10) Gurdāspur, (11) Siālkot, (12) Gujrānwāla.

III. *Jullundur* (*Jālandhar*) *division*: (13) Kāngra, (14) Hoshiārpur, (15) Jullundur (Jālandhar), (16) Lūdhiāna, (17) Ferozepore.

IV. *Rāwalpindi division*; (18) Gujarāt, (19) Shāhpur, (20) Jhelum, (21) Rāwalpindi, (22) Attock.

V. *Multān division*: (23) Miānwāli, (24) Jhāng, (25) Multān, (26) Muzaffargarh, (27) Dera Ghāzī Khān, (28) Lyallpur.

The whole province is 'non-regulation', and formerly many members of the superior or 'commission' staff were officers of the army, but recruitment is now confined to the Civil Service of India only. In the Dera Ghāzī Khān district, which marches with Balūchistan, and the Miānwāli district, which adjoins the North-West Frontier Province and includes part of the Salt Range, the Frontier Crimes Regulation is in force. The province 'non-regulation'.

The highest judicial authority in the settled districts is the chief court of the Panjāb, which possesses powers substantially identical with those of a chartered high court. The chief court.

The lieutenant-governor at present (1913) has no executive council, but may be provided with one in a few years. A legislative council has existed since 1897. Councils.

The land 'settlements' have been made for the most part with village zemindars, as in the Agra province. Land settlements.

The native states connected with the province and controlled by the local government are no less than 43 in number. Of the 43 states the three Phūlkiān states Native states.

(Patiāla, Jīnd, and Nābha) and Bahāwalpur are in charge of a political agent resident at Patiāla, who is under the direct control of the lieutenant-governor; Chamba, a hill state, is under the commissioner of Lahore; Kapūrthala, Farīdkot, Māler Kotla, Mandi, and Suket are under the commissioner of Jullundur; Sirmur, Kalsia, Dujāna, Pataudi, and Lohāru are under the commissioner of Delhi; and the 28 petty Simla hill states are supervised by the deputy commissioner of Simla, who is *ex officio* superintendent.

The relations of the British Government with Bahāwalpur are regulated by a treaty executed in October 1838; and those with the other states by *sanads* or charters granted by the governor-general. The rulers of Bahāwalpur, Kapūrthala, and the three Phūlkiān states possess the power to inflict capital punishment. The conditions imposed by the various *sanads* of the minor states differ widely.

VII. *Delhi*

Formation of the province.

This tiny province, 557 square miles in area, was constituted on October 1, 1912, for the purpose of giving the Government of India unfettered control over the new official capital and its vicinity. The area had formed part of the Delhi district (Delhi and a portion of Ballabgarh subdivisions) in the Delhi territory taken over by the Panjāb in 1858, and organized as the Delhi division, now replaced by the Ambāla (Umballa) division.

Administration.

The administration is in the hands of a chief commissioner controlled directly by the Government of India. The laws of the Panjāb remain in force and the chief court of that province retains its jurisdiction.

VIII. *The North-West Frontier Province*

Formation of the province.

The North-West Frontier Province, occupying an irregular strip of country, extending north and south for over 400 miles, mostly on the western side of the Indus, was constituted in 1901 by Lord Curzon, by taking five

districts from the Panjāb, and associating with them a large area of tribal territory, with the purpose that the Government of India should acquire direct control over the politics of the most troublesome part of the frontier.

British districts.

The five districts excised from the Panjāb, namely, Hazāra, Peshāwar, Kohāt, Bannū, and Dera Ismail Khan are British territory, administered in the ordinary 'non-regulation' way by deputy commissioners, invested with certain special powers appropriate to frontier conditions. The area of those districts is about one-third of the province.

Tribal territory.

The remaining two-thirds are not British territory, being occupied by Pathān tribes under more or less control. Some of those tribes, although allowed to manage their internal affairs in their own fashion, are regulated considerably by five political agencies, namely, those of (1) Swāt, Dīr, and Chitrāl, (2) the Khyber; (3) Kurram, (4) Northern Wazīristān, with head-quarters in the Tochi Valley, and (5) Southern Wazīristan, with head-quarters at Wāno or Wānā.

The tribes occupying Tirāh and many other large areas on the British side of the Afghan frontier, or 'Durand line', demarcated in 1894 and 1895, are absolutely free from civil control of any kind, and are amenable only to negotiation or military force.

Administration.

The political agents control their half-tamed charges so far as possible by means of the assent of tribal assemblies called *jirgas*. The same machinery is used for negotiation with the independent tribes.

Procedure on the frontier is necessarily more summary and elastic than that followed in an ordinary district of British India. The staff of the province consists partly of military officers. The head of the government, the chief commissioner and agent to the governor-general, deals directly with his district officers and political agents, without the intervention of commissioners. He is himself controlled in political matters by the Foreign Department of the Government of India. He is assisted by a secretariat

organized on a modest scale, his secretary being a man who plays many parts. There is, of course, no room in such a province for either an executive or a legislative council. The capital is Peshāwar.

B.—*Provinces of Southern and Western India, with the dependent Native States.*

IX. The Central Provinces, with Berār.
X. The Presidency of Madras or Fort St. George.
XI. The Presidency of Bombay.
XII. Coorg.

IX. *The Central Provinces, with Berār*

Formation of the province.

The Central Provinces—not to be confounded with Central India, a group of native states—occupy a large part of the Vindhyan barrier between Hindustan and the Deccan. The territory was acquired from the Marāthas. The northern portion, formerly called the Saugor and Nerbudda Territories, was ceded in 1817 and 1818. The remainder was annexed under the doctrine of 'lapse' in 1853.

After various administrative expedients had been tried, the Central Provinces were constituted a separate local government as a minor province under a chief commissioner in 1861. The sub-province of Berār (*q. v.*) was attached to the provinces in 1903.

Administration.

The administration is conducted on the 'non-regulation' system by a chief commissioner, subject to the control of the Government of India. He has not a council, either executive or legislative, but the reformers are anxious (1913) to provide him with both. The land settlements are usually made with village zemindars. The highest judicial authority is vested in a judicial commissioner, enjoying powers substantially the same as those of a high court.

Districts and divisions.

The country, including Berār, is organized as 22 districts in 5 divisions, or commissioners' charges, namely:

I. *Jubbulpore* (*Jabalpur*) *division*: (1) Saugor (Sāgar), (2) Damoh, (3) Jubbulpore, (4) Mandlā, (5) Seonī.

II. *Narbadā* (*Nerbudda*) *division*: (6) Narsinghpur, (7) Hoshangabad, (8) Nimār, (9) Betūl, (10) Chhindwāra.

III. *Nāgpur division*: (11) Wardhā, (12) Nāgpur, (13) Chānda, (14) Bhandāra, (15) Bālāghāt.

IV. *Chhattīsgarh division*: (16) Drūg, (17) Rāipur, (18) Bilāspur.

V. *Berār division*: (19) Amraoti, (20) Buldāna, (21) Akola, (22) Yeotmāl.

The capital is Nāgpur (Nagpore).

Native states.

Fifteen feudatory states are attached to the Central Provinces, and are supervised by one political agent acting under the orders of the chief commissioner. Except one small state (Makrai), all are within the limits of the Chhattīsgarh division. The legal powers of the chiefs vary considerably, but in practice all the states are largely controlled by the British administration. Bastar, to the south-east, is by far the largest.

The sub-province of Berār

Formation of the sub-province.

Berār, as now constituted, coincides with about half of the Mogul *Sūba* of the same name in Shahjahān's time. In the eighteenth century the *Sūba*, or most of it, passed into the hands of the Marāthas, and, after the close of the second and third Marātha wars, in 1804 and 1818 respectively, was made over in instalments to the Nizam. In 1853 the districts now forming the sub-province were assigned to the East India Company in order to defray the expense of the Hyderabad contingent, and so became known as the 'Hyderabad Assigned Districts'. They were managed as a minor 'non-regulation' province under the control of the president at Hyderabad, as chief commissioner. In October 1903 the Nizam agreed, under pressure from Lord Curzon, to lease the districts (with some modification of boundaries) in perpetuity to the Government of India for an annual rent of 25 lakhs of rupees. Since then the Berār districts have been attached as a division, or commissioner's charge, to the Central Provinces. Thus it appears that Berār, like Mērwāra,

strictly speaking, is not British territory, although, for all practical purposes it is such, and is administered on the same lines as other 'non-regulation' provinces.

Administration.

The law of British India does not apply to Berār, unless specially extended to it by the governor-general-in-council, which authority also makes any local regulations required. The highest appellate court, civil and criminal, is that of the additional judicial commissioner of Nāgpur, but the high court of Bombay exercises jurisdiction over 'European British subjects'. Most of the territory is 'settled' on the Bombay *rayatwari* system, with individual peasants.

X. *The Presidency of Madras or Fort St. George*

Formation of the presidency.

The area of the Madras presidency, now exceeding that of the United Kingdom by 20,000 square miles, has grown gradually by successive increments to the 6 square miles bought by Francis Day for the East India Company in 1640. The first important accession of territory was the Jāgīr, now the Chingleput district, granted in perpetuity by the Nawāb of the Carnatic in 1763, as confirmed by the Mogul Emperor two years later. The 'Northern Circars' (properly, Sarkārs or districts), namely, Ganjām, Vizagapatam, Godāvari, Kistna (Krishnā), and Gantūr, were acquired by treaties made in 1765 and 1766, but the southernmost district, Gantūr, did not come under British administration until 1788. The dominions of the Nawāb of the Carnatic were annexed in 1801, and the rest of the presidency was acquired for the most part as the result of the third and fourth Mysore wars, which ended respectively in 1792 and 1799; but Kurnool (Karnūl) was not annexed until 1839.

24 districts.

The result of those annexations and many minor changes is that the presidency now consists of 24 districts, namely: (1) Ganjām, (2) Vizagapatam, (3) Godāvari, (4) Kistna (Krishnā), (5) Gantūr, (6) Nellore, (7) Cuddapah, (8) Kurnool (Karnūl), (9) Bellary, (10) Anantapur, (11) Madras City, (12) Chingleput, (13) North Arcot, (14)

Salem, (15) Coimbatore, (16) South Arcot, (17) Tanjore, (18) Trichinopoly, (19) Madura, (20) Tinnevelly, (21) Nīlgiris, (22) Malabar, with the Laccadive Islands, (23) South Kanara, and (24) Anjengo.

No commissioners' divisions.

Madras, among the larger provinces, is peculiar in having no divisions or commissioners' charges. Each district officer corresponds directly with the government or board of revenue, as the case may be, and not through a commissioner as elsewhere.

Anjengo district.

Anjengo (No. 24) is a merely nominal district, having been constituted in 1906 by the separation of Anjengo and Tangasseri from the collectorate of Malabar and their formation into a new district under the administrative control of the resident in Travancore and Cochin. The two places named are small patches of British territory, 211 and 96 acres in extent respectively, situated within the territorial limits of Travancore. A British commercial settlement had existed at Anjengo since 1684. Tangasseri had been occupied successively by the Portuguese and Dutch.

System of administration.

The 24 districts are now all administered in the ordinary 'regulation' manner by executive and judicial officers of standing similar to those employed in other settled provinces. A board of revenue controls the revenue staff, and the chartered high court of Madras is the supreme judicial authority. The land is mostly 'settled' on the *rayatwari* system with individual peasants, as in Bombay. The government has always been that of a governor-in-council, as in Bombay, privileged to correspond directly with the secretary of state. The governor is usually a nobleman or other person of distinction sent out from England. The executive council, which used to consist of only two members, has been enlarged to three under the Councils Act of 1909. The legislative council, in existence since 1861, has been much enlarged and vested with enhanced powers under the same Act.

The agencies.

Large areas of hill and forest country, resembling in character the tributary or feudatory states of Orissa and the Central Provinces, are attached to the districts of

Ganjām, Vizagapatam, and Godāvari. Those tracts are known as the agencies. Being inhabited by backward, uncivilized tribes, they are exempt from the operation of the ordinary law, and are ruled by the district officers concerned in virtue of special powers conferred on them as agents of the governor. The district officer is the chief civil and criminal tribunal of each of the agencies, but an appeal from his decisions lies to the high court in some cases and to the governor-in-council in others.

Native states.

The organized native states in political relations with the Madras government are five in number, namely (1) Travancore, (2) Cochin, (3) Pudukottai, (4) Banganapallé, and (5) Sandūr. Travancore, now a highly organized state, is admirably administered by the Maharāja, descendant of an ancient house. A legislative council prepares regulations, which require the sanction of the Madras Government before promulgation. That rule applies to all the states under the control of Madras. The smaller state of Cochin is administered on similar lines by the Rāja. Both rulers possess the power of life and death. The resident at Trivandrum, the capital of Travancore, supervises the affairs of both states. The most important of the three minor states is Pudukottai, which is governed by the Rāja with the assistance of a minister and a councillor. A representative assembly on the Mysore model was constituted in 1902. Its functions are merely advisory, and it meets only once a year. The district officer of Trichinopoly is *ex officio* political agent for the state. Banganapallé and Sandūr are similarly controlled by the district officers of Kurnool and Bellary respectively.

XI. *The Presidency of Bombay*

Formation of the presidency.

The Bombay presidency, now occupying all Western India from the mouths of the Indus to parallel 13° 53′ N. lat., has grown out of the cession by the Portuguese in 1661 of the island of Bombay, measuring about 11½ miles in length by 3 or 4 in breadth. The little fort of Bānkōt, or Fort Victoria, on the mainland, 73 miles south-east

from Bombay, was ceded by the Marāthas in 1756. The island of Salsette adjoining Bombay, with the islets in the harbour, was acquired in 1774, and Surat was taken in 1800. At the beginning of the nineteenth century those small areas constituted the whole of the presidency. The acquisition of the rest of the existing territory in the peninsula was mainly the result of Lord Wellesley's and Lord Hastings's Marātha wars, and was effected between 1803 and 1827. Aden in Arabia was added in 1839. Sind was conquered and annexed in 1843, and the Pānch Mahāls district was finally transferred by Sindia in 1861. The North Kanara district was taken over from Madras in the same year. Minor annexations need not be detailed.

Districts and divisions.

The territory, excluding Aden and the city of Bombay, is divided into 25 districts, distributed in 4 divisions or commissioners' charges, as follows:

I. *Sind division*: (1) Karāchī (Kurrachee), (2) Hyderabad, (3) Larkāna, (4) Sukkur, (5) Thar and Pārkar, (6) Upper Sind Frontier.

II. *Northern division*, with head-quarters at Ahmadabad: (7) Ahmadabad, (8) Broach (Bharōch), (9) Kaira, (10) Pānch Mahāls, (11) Surat, (12) Thāna (Tannah).

III. *Central division*, with head-quarters at Poona: (13) Ahmadnagar, (14) East Khāndēsh, (15) West Khāndēsh, (16) Nāsik, (17) Poona, (18) Sātāra, (19) Sholapur.

IV. *Southern division*, with head-quarters at Belgaum: (20) Belgaum, (21) Bījāpur (Beejapore), (22) Dhārwār, (23) Kanara (North), (24) Kolāba, (25) Ratnagiri; (26) Bombay city is administered separately, and counted as a district, but is not included in any division.

Sind.

Sind is treated as a separate sub-province, the commissioner being invested with special powers, which relieve the Bombay government of certain functions. The whole of Sind is nominally 'non-regulation', but the four districts of Karāchī, Hyderabad, Larkāna, and Sukkur are now administered in the ordinary way by district officers, with the title collector and magistrate. The outlying districts of Thar and Pārkar and the Upper Sind

Frontier are administered in a simpler fashion by deputy commissioners vested with exceptional powers. The judicial commissioner of Sind has the powers of a high court, like the similar officer in Oudh. The high court of Bombay has no jurisdiction over Sind, except for certain limited purposes.

Aden. The fortress of Aden (chap. x), with a small adjoining area, is British territory and subject to the general control of the Bombay government. The administration is entrusted to the general commanding, who is *ex officio* resident, and the ordinary Indian law is supplemented by special regulations when necessary. Perim, Sokotra, and the Kuria Muria Islands are dependencies of Aden.

General administration. The 19 districts of the northern, central, and southern divisions are all 'regulation', and administered on the regular lines.

The presidency is governed, like Madras, by a governor-in-council. The governor, as in Madras, is authorized to correspond directly with the secretary of state. Both the executive and legislative councils have been enlarged in pursuance of the Councils Act of 1909.

The judicial administration of the presidency, Sind excepted, is under the control of the chartered high court at Bombay.

Native states. The native states of Bombay are far more numerous than those in any other province. 'The powers of the chiefs are regulated by treaty or custom, and vary from authority to try all criminal offences not committed by British subjects, and complete civil authority, as in the case of the Maharāja of Kolhāpur, to the mere right to collect revenue in a share of a village, without criminal or civil jurisdiction, as in the case of the petty chiefs of the Kathiāwār peninsula. When the chief lacks the power to dispose of criminal or civil cases, they are dealt with by the political agent.' Border disputes between the states of Gūjarāt and those of Rājputāna are decided by special tribunals.

The states may be grouped in three classes, viz.:

I. Kolhāpur, Sāvantvādi, and Cutch (Kachh), each

having a political agent of its own, under the governor-in-council.

II. Local groups of states, with a political agent for each group, under the governor-in-council. Those groups are (1) the Mahī Kāntha States, (2) the Pālanpur States, (3) the Kāthiāwār States, (4) the Southern Marātha Jāgīrs.

III. Minor states, looked after by the collectors of adjoining districts. The principal of these is Khairpur in Sind, superintended by the collector of Sukkur.

XII. *Coorg*

Formation of the province.

The little province of Coorg, lying to the west of Mysore on the summits and slopes of the Western Ghāts, was annexed by Lord William Cavendish-Bentinck in May 1834, in consequence of the atrocities committed by a bloodthirsty rāja.

Administration.

Until 1881, when the rendition of Mysore to the Hindu dynasty took place, Coorg was administered under the orders of the commissioner of Mysore, who was *ex officio* also commissioner, or, from 1869, chief commissioner of Coorg. Since that date the supreme authority, under the Government of India, has been vested in the resident in Mysore, who is *ex officio* chief commissioner of Coorg. His head-quarters are at Bangalore. The local administration is conducted, like that of a district, in all its branches, by a commissioner and two assistant commissioners, whose head-quarters are at Mercāra. The chief commissioner has the executive powers of a local government and the judicial powers of a high court. For purposes of detailed administration the country is divided into five *taluks*, each under an Indian official. The land system is peculiar.

C.—*Provinces outside India, with the dependent Native States.*

XIII. Balūchistan.
XIV. Burma.
XV. The Andaman and Nicobar Islands.

XIII. *Balūchistan* (*Balōchistan*)

Formation of the province.

Balūchistan, lying on the far side of the Bolān Pass, is well outside the geographical limits of India. Political

relations with the country began in 1839. Quetta was permanently occupied in 1876, and with the surrounding territory was leased from the Khān of Kalāt (Khelat) in 1883. The founder of the province as it now exists was Sir Robert Sandeman, who died in 1892. Various treaties, leases, and boundary arrangements have resulted in the present situation. The province consists of:

(1) British Balūchistan, which was acquired by treaty in 1879.

(2) Agency territories, which are tracts brought by lease or other means at various times under more or less direct British control. The most important district in the province is that of Quetta-Pishin, held under perpetual lease from the Khān of Kalāt. There are five other districts.

(3) The native states of Kalāt (Khelat) and Lās Bela, of which only (1) is strictly British territory, but the difference in status between (1) and (2) is purely formal. The boundaries have been demarcated at various dates since 1861.

Administration.

The administration of the whole is conducted by a chief commissioner and agent to the governor-general, usually a military officer, on 'non-regulation' principles, with the help of a revenue commissioner, judicial commissioner, and a small staff. The deputy commissioners in charge of districts are also political agents for neighbouring agency territories, and the usual sharp distinction between 'district' work and 'political' work does not exist. The term 'agency territories' is elastic, including areas which are directly administered as well as tracts which are merely 'politically' controlled. The entire administration is devised on similarly elastic lines. Indian Acts and Regulations are extended to British Balūchistan either under the Scheduled Districts Act (XIV of 1874), or by special mention in the law itself, and are applied to the agency territories by the governor-general-in-council under the Indian (Foreign Jurisdiction) Order in Council, 1902. Many laws peculiar to Balūchistan exist. The Murderous Outrages Regulation of 1902, also

in force in the North-West Frontier Provinces, provides summary punishment for grave offences, necessary in a wild country.

The judicial commissioner has the powers of a high court, except as regards 'European British subjects', who are subject to the jurisdiction of the Panjāb chief court. In certain cases the ordinary courts are excluded, and disputes are settled by a tribal council or *jirga*, as in the North-West Frontier Province. In course of time, no doubt, the administration of the more settled regions will become more like that of an ordinary Indian district.

Native states.

Kalāt is a confederacy of tribal groups headed by the Khān of Kalāt. The formal relations of the state with the British Government rest on treaties executed in 1854 and 1876. In practice, the orders of the agent to the governor-general must be obeyed.

The chief of Lās Bela, known as the Jām, nominally a feudatory of the Khān of Kalāt, is actually under the control of the political agent at Kalāt.

XIV. *Burma*[1]

Formation of the province.

The huge province of Burma was annexed, after three wars, in three instalments, namely, Arakan and Tennasserim in 1826, Pegu in 1852, and Upper Burma in 1886. After the first war Arakan was attached to Bengal; and when Pegu was annexed in 1852, Martaban was placed under the commissioner of Tennasserim, while the rest of the province was made over to a commissioner stationed at Rangoon. Both those commissioners were under the direct control of the governor-general. In 1862 the whole of British or Lower Burma, including Arakan, was constituted a separate local government under a chief commissioner. Upper Burma, after annexation, was added to the chief commissioner's charge. In 1897, the entire province, the largest in the Indian Empire, was raised to the rank of a lieutenant-governorship.

[1] [In Burmese place-names the letters ö and ü are sounded as in German; *gy* = approximately *j*; *ky* = approximately *ch*, as in 'child'.

On Burma generally, see A. Ireland, *The Province of Burma*, 1907.]

The three classes of territory.

The territories under the control of the lieutenant-governor consist of (1) British Burma, (2) the Shan States, and (3) the Chin and Kachin Hills. The Karenni states also are in political relations with the Government of Burma.

Districts and divisions of British Burma.

British Burma consists of 37 districts, arranged in eight commissioners' charges or divisions, as follows:

(1) Arakan	division =	4	districts
(2) Pegu	,,	5	,,
(3) Irawadi	,,	5	,,
(4) Tennasserim	,,	6	,,
(5) Minbu	,,	4	,,
(6) Mandalay	,,	5	,,
(7) Sagaing	,,	4	,,
(8) Meiktila	,,	4	,,
		37	

It is unnecessary to give the strange and uncouth names of the districts.

Capital.

Rangoon is the capital of the whole province, but Mandalay in Upper Burma is treated as a secondary capital.

Administration of British districts.

The British districts are administered on 'non-regulation' principles by deputy commissioners. In Upper Burma special regulations are in force, and the administration of that section of the province (divisions 5–8) is in a transitional state. That of Lower Burma (divisions 1–4) differs little from that of an ordinary 'regulation' district in India. The revenue settlements are *rayatwari*, made with each individual peasant occupier.

The local government.

The lieutenant-governor is assisted by a secretarial staff and heads of departments in the usual way, but has not an executive council. A legislative council has existed since 1897, and has been enlarged under the Councils Act of 1909.

Judicial system.

In Lower Burma, the chief court, constituted like that of the Panjāb, exercises the powers of a high court. In Upper Burma, the judicial commissioner at Mandalay is vested with the supreme judicial authority. The sub-

ordinate courts in Upper Burma have not been fully developed.

The Shan States on the eastern side of the province are divided into five groups, namely: (1) Northern, under control of a superintendent at Lashio; (2) Southern, under control of a superintendent at Taungyi; (3) Myelat States, under control of a superintendent at Taungyi; (4) Möngmit, under control of the commissioner of Mandalay; (5) two states, under control of the commissioner of Sagaing. The chiefs manage their internal affairs, in most respects, subject to a certain amount of supervision. The Shan States.

The chiefs of the Chin Hills on the west are managed by a superintendent, who acts under a special Regulation (V. of 1896). The Chin, Kachin, and Karenni tribes.

Similarly, some of the Kachin tribes on the north are controlled under the provisions of Regulation I of 1895.

The Karenni territory on the east is not reckoned as part of British India, and is little interfered with, but the superintendent of the Southern Shan States and one of his assistants exercise certain judicial powers.

The native or protected states connected with the province are reckoned to be 52 in number.

XV. *The Andaman and Nicobar Islands*

The Andaman and Nicobar islands, being the summits of the submarine range of mountains connecting the Burmese Yoma with Sumatra, should naturally be under the government of Burma, as are the Cocos and Preparis islands lying between the Andamans and the mainland. But the utilization of the Andamans since 1858 as a penal settlement for heinous offenders from India makes it desirable that that group, as well as the Nicobars farther to the south, should be under the direct control of the Government of India. The two groups, accordingly, were constituted a chief commissionership in 1872. The Andamans have been in British occupation since 1789. The Nicobars were occupied in 1869, after friendly negotiation with the Danish Government, which had old claims to the sovereignty. Formation of the province.

Administration.

The chief commissioner is *ex officio* superintendent of the penal settlement at Port Blair, and is mostly occupied with his work in that capacity. The very backward tribes inhabiting the Andaman islands are left to themselves as a rule. The people of the Nicobars are more advanced, and their chiefs receive certificates of appointment from the chief commissioner. It is hardly necessary to add that the usual organization of a province is not applicable to either the Andamans or the Nicobars.

D.—*Native States in direct relation with the Government of India.*

I. Kashmīr with Jummoo (Jamū).
II. Baroda.
III. Hyderabad or the Nizam's Dominions.
IV. Mysore.
V. Rājputāna.
VI. Central India

3 states; 2 groups.

Excluding Nepāl and Bhutān, with Sikkim, which may be considered independent, the native states in direct relations with the Government of India are four individual states, namely (1) Kashmīr with Jummoo (Jamū), (2) Baroda, (3) Hyderabad or the Nizam's Dominions, and (4) Mysore; with two groups of states, namely (5) Rājputāna (Rājasthān or Rājwāra), and (6) Central India.

I. *Kashmīr with Jummoo (Jamū)*

Formation of Kashmīr state.

The Kashmīr (Cashmere) state in its existing form, including the valley of Kashmīr, with the Jummoo (Jamū) state on the south, and a large area of mountainous territory extending northwards to the Pāmīrs, is the result of arrangements made in 1846 after the first Sikh war, when the Rāja of Jummoo, in consideration of the payment of 75 lakhs (7,500,000) of rupees, was allowed to take possession of Kashmīr proper, and afterwards to extend his domain.

Administration.

Kashmīr proper has a long and painful history, and it is only within the last few years, from about 1900, that the state has enjoyed a reasonably good government.

The resident exercises considerable control over the internal administration of the Mahārāja, which is carried on by ministers and four local governors. The resident

is assisted by a political agent at Gilgit and another officer stationed at Leh. The army numbers more than 6,000 men.

II. *Baroda*

Formation of the Baroda state.

The Baroda state was formed during the eighteenth century by the exertions of a predatory Marātha chief, known as the Gaekwār.

The authority of the British resident at Baroda became paramount in virtue of a treaty concluded in July 1802, which was made more stringent in 1805.

The territory of the state consists of isolated patches in Kāthiāwār and Gujarāt, interlaced with British districts, and therefore freely exposed to British influence.

Administration.

The administration is conducted on modern lines by an executive council, subject to the general supervision of the Mahārāja or Gaekwār, who is assisted by a Dīwān and other officers. A high court controls the judicial service. A small army of less than 5,000 men is maintained.

III. *Hyderabad or the Nizam's Dominions*

Origin of the Nizam's dominions.

The Nizam's dominions, which became independent of Delhi in 1724, are by far the most important of the native states. Since 1798, in virtue of successive treaties from that date, the Nizam's government has been under British control, exercised through the resident at Hyderabad.

Administration.

The country is divided into 15 districts, arranged in 4 *Sūbas* or divisions, and the administration generally follows the British model. A legislative council was established in 1893, and a high court presides over the judicial service. The army numbers more than 24,000 men.

IV. *Mysore*

The state.

Mysore is the second of the native states in population, although exceeded in area by Kashmīr, Kalāt, and Jodhpur. The state, which had been restored to the Hindu dynasty in 1799, after the death of Tippoo, was under the management of a British commission for half

a century from 1831 to 1881. In the latter year it was again made over to the Mahārāja, and since then has been well governed on British principles.

Administration

The territory is divided into eight districts, each under a deputy commissioner. The government is conducted on behalf of the Mahārāja by the Diwān or minister, aided by two councillors, and is provided with full departmental machinery. The heads of departments have their offices at Bangalore, but the principal residence of the Mahārāja is at Mysore City. The representative assembly meets there once a year, when it receives the minister's financial statement, and has the privilege of making suggestions to the government. The legislative department is managed by a secretary, without the aid of a council. The judicial service is controlled by the chief court. The state army numbers less than 3,000 men, and a force of over 5,000 men, British and native, forming the 9th division, directly under the commander-in-chief in India, is stationed within the state.

V. *Rājputāna*

The agency.

The states of Rājputāna number eighteen, besides two chiefships, the rulers of which do not enjoy the title of highness, or hold their position in virtue of treaties, as do the rulers of states. Alwar entered into a treaty in 1803, but the seventeen remaining states executed their treaties in 1817 and 1818. The most considerable states are Jaipur or Ambēr, Udaipur or Mewār, Jodhpur or Mārwār, and Bikanir. All are controlled by the agent to the governor-general, stationed at Mount Ābū, who is aided by a staff of residents, political agents, and assistants.

Administration.

The ruler of each state is master in his dominions, subject to the customs of his clan, and the general control of the British authorities, who interfere unwillingly, and only in case of urgent necessity. The states vary much in the character of the administration, some being still rather mediaeval in their ways, while others are in close touch with modern ideas. The most luminous general description of Rājpūt political institutions is that given

by Sir Alfred Lyall in *Asiatic Studies*, First Series (1907), chapter vii.

VI. *Central India*

Central India, not to be confounded with the Central Provinces (which see), is a group of states like Rājputāna, controlled by an agent to the governor-general, with a staff of residents, political agents, and assistants. Each state manages its own affairs in its own way, subject to the general supervision and, in case of necessity, the interference of the Government of India. The agent resides at Indore, Holkar's capital. The agency

The leading states are Gwalior or Sindia's dominions; Indore, or Holkar's dominions; and Bhopāl. The agency includes 148 native states and estates (as well as a large part of the Tonk state attached to the Rājputāna agency), which range in size from Gwalior, with 25,000 square miles, to small holdings of only a single village.

Eleven states, known as treaty states, hold, under direct treaty, engagements with the British Government, mostly executed in 1817 and 1818. Those states are Gwalior, Indore, Bhopāl, Dhar, Dewās (2), Jaora, Orchha, Datiā, Samthar, and Rewah. Three classes of states.

Thirty-one minor states have direct relations with the Government of India under *sanads* or grants.

The remaining small states and estates are known as mediatized or guaranteed, having been subject to bigger powers at the time of the general pacification in 1817 and 1818, when their interests were protected by special arrangements.

The states vary so enormously in all respects that no general statements concerning them can be made with advantage. The three leading states named above maintain considerable military forces. Administration.

E.—*Foreign Possessions.*

I. Portuguese. II. French.

Five European nations—the Portuguese, Dutch, French, Danes, and English—long strove for the mastery of the rich commerce of India and sought to further their pur- Failure of all nations save the English.

pose by founding settlements on Indian soil. All save the English failed. In 1825 the few petty Dutch settlements remaining on the coasts were surrendered by treaty, and twenty years later the Danes sold their last possession —Tranquebar on the Coromandel coast—for a million and a quarter of rupees.

The Portuguese and French retain some poor fragments of the territories which each nation once hoped to develop into an Indian empire, and a short summary of their administrative arrangements may properly be included here, in order to indicate their relationships with the British administration.

Portuguese territory.

The Portuguese possessions are Goa, Damān, and Diu. Goa includes the island of that name, with certain territory on the mainland, known as the New and the Old Conquests, aggregating 1,301 square miles, lying to the west of the Belgaum and North Kanara districts of the Bombay Presidency. The little island of Anjidiv, farther to the south, on the coast of the North Kanara district, half a square mile in extent, is a dependency of Goa. The harbour of Marmagao is the best on the western coast after Bombay, and would be of much commercial importance if held by a more progressive power. The settlement of Damān (149 square miles), on the coast of the Thāna (Tannah) district, about 100 miles north of Bombay, now has little trade. Diu is an island, 20 square miles in extent, at the southern extremity of the Kāthiāwār peninsula. The village of Gogola, on the mainland, and the fort of Simbor on an islet about 12 miles from the town, are dependencies of Diu.

Administration.

The Portuguese system of administration is elaborate, being designed for an area much larger than that actually held. The supreme authority, civil and military, is vested in the governor-general of Goa, who is assisted by several councils. The settlements of Damān and Diu are administered by governors. The military force is less than 3,000 men. A British consular agent is stationed at Goa.

French territory.

The French possessions are still more insignificant than the Portuguese. They consist of (1) the Pondicherry

settlement (115 square miles), within the limits of the South Arcot district, Madras, and made up of several detached patches; (2) the Kārikāl settlement (53 square miles), in the Tanjore district; (3) Mahé (26 square miles), on the coast of the Malabar district; (4) Yanāon or Yanam (5 square miles), in the delta of the Godāvarī, and within the limits of the Godāvarī district; (5) Chandernagore (Chandarnagar), 4 square miles, a small town on the Hooghly, 22 miles from Calcutta; and (6) a plot of 38 acres in the town of Balasore, Orissa—total 203 square miles.

Administration.

The administration, as in the Portuguese possessions, is constructed on lines suitable for a much more extensive territory. The civil and military command of the whole is vested in the governor of Pondicherry, who is assisted by a large staff, including a minister of the interior. Each of the minor settlements is ruled by an administrator, with the help of many officials. The collector or district officer of South Arcot is empowered, as special agent, to transact business with the Pondicherry authorities concerning crime, land customs, excise, and kindred matters. A British consular agent, usually a military officer, is accredited to the government at Pondicherry. With the exception above noted, communications with the French and Portuguese governments are conducted by the foreign department of the Government of India.

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CHAPTER VIII

WESTERN INFLUENCE

By Sir R. C. Temple, Bart.

Beginning and development of Western influence.

It is usual to date the extension of European influence to India from Clive's victory at Plassey in 1757, but it can hardly be said to have reached the people in any effective degree till the beginning of the nineteenth century. Even then, during the period of the governors-general under the East India Company, there was so much political confusion and disturbance throughout the country, creating a state of discontent with the new order of affairs which culminated in the Mutiny, that the progress of the inevitable consequences of contact with a dominating Western people was greatly retarded. Since the Mutiny, however, the establishment of the universal internal peace known as the Pax Britannica has enabled the social forces set in motion by the British system of government to produce their natural effects. Those effects have been none the less revolutionary for being silent, unobtrusive, and gradual in action. There have been previous periods of drastic social change in India: by evolution, as when Hinduism arose out of the old Animistic faith of the prehistoric Western immigrants; and by violence, as when some two thousand years afterwards Muhammadan invaders, again from the West, laid heavy hands, about seven hundred years ago, on the well-developed Hinduism of their day. But at no period in the history of the country have there been forces at work causing such an upheaval in society as is going on now under the irresistible and universal pressure of an old and highly developed Western civilization on that of a people saturated with an Eastern culture, equally long-established and separately developed. The changes brought about in this way have affected every phase of the popular life, and however great they may have been

Revolutionary nature.

they have necessarily tended to be imperceptible and impalpable, but nevertheless their results have come to the surface in various ways.

Strength of caste feeling.

The outstanding feature of Indian life, which differentiates it from that of every other country in the world, is the feeling of caste, which for the present purpose may be defined as the principle of exclusiveness, visible in a varying degree in all social and sectarian systems, but carried in India to its full logical extent. To the Indian's mind his caste is his own social environment rendered completely exclusive by a birthright of divine origin: a right made absolute by countless generations of loyal forbears, which he has for that reason scrupulously to preserve. The value of his caste to the possessor depends therefore firstly on purity of descent, and secondly on avoidance of damaging contact with those outside it. The strength of the social emotions engendered by the long establishment of the caste system everywhere in India is so great that all the violence of the many invaders, all the long-continued pressure of the Muhammadan rulers, all the preaching of many eclectic reformers and founders of sects, have not only failed in the long run to break down the system, but have actually succumbed to its pervading influence; so that in the end the invariable tendency has been for the assailants themselves to congregate into castes with some degree of full Hindu exclusiveness. And yet signs of a final disintegration of caste through further development under British rule are by no means wanting.

Tendency to minute subdivisions.

It is always difficult to speak of India as a whole, because it is so easy to show that any given remark of a general nature does not apply to a certain individual case, or even to groups of cases. With this observation by way of caution to the reader, it may be said that the actual condition of modern Indian society, which has arisen out of caste feeling and is now so seriously menaced by causes beyond control, is that the population has everywhere become split up into minute subdivisions, often consisting of a few families only, living ethically isolated

lives, mixing indeed in the business of life, but hardly at all socially. So much is this the case that even where there are nominally great general castes like the Brahmans, spread in large numbers all over the country, they are split in practical life into sub-castes innumerable, which are for the purposes of domestic intercourse separated from each other. A Brahman of Kashmir is not in practice a Brahman to a fellow-caste man hailing from Madras, nor would one of Bombay admit another from Bengal to full caste-fellowship. Such a social system as this is bound to lead to caste occupations, and so it is commonly, though not at all necessarily, the case in India that caste is synonymous with profession, however humble and even degrading that may be. The tendency to subdivision has carried the people very far indeed, and has invaded their religious practices, dividing society into an immense number of small sects, each with its own system of ethics.

Good and bad features.

Like every social system, caste has its good and bad features. It produces hereditary professional skill and provides security of livelihood and occupation. It creates mutual helpfulness, a kind of freemasonry, amongst all congeners, and a public opinion that acts, especially in the case of women, as a useful deterrent to those tempted to break through social conventions relating to morality and proper conduct, because excommunication has real terrors for the members of a caste. But politically its effects have throughout history been disastrous, and must in the nature of things always be so. It stirs up rivalry and feuds to such an extent as to make the people unable to combine in the face of common perils, and through all time it has placed the country directly or indirectly under the yoke of the foreigner, and that in spite of the obvious physical strength, courage, and intellectual capacity of its inhabitants. So long as it remains a guiding principle of life, so long must the people subjected to it render themselves liable to foreign domination.

Disintegration of caste: by

The eventual disintegration of this compelling force and the ultimate breaking down of its iron barriers are

unmistakably visible in various directions. Thus, for some generations past European scholars and educationists have been investigating Indian history and Indian society by Western methods of criticism, and not only have brought about in consequence a remarkable change in their own knowledge of the real value of the pretensions put forward as to purity of caste, but have implanted both their methods and their results in the minds of native writers and inquirers: so that nowadays it is the Indians themselves that are looking into the matter, no longer in a warm patriotic spirit, but from a cold Western critical standpoint, with the result that it is they, and not the Europeans, who are uprooting the ancient beliefs in purity of descent in the case of even the highest castes—the arrogations of the Brahmans faring no better than those of any other community in the broad daylight of modern native criticism. In this matter, then, of Western education of the powerful critical faculties of the native Indians, there is a force at work, which is purely the result of close contact with minds imbued with a foreign civilization, which no single person or society has brought into being, which no political power and no patriotic movement can arrest, and of which no one living can foresee the exact result.

Western education;

The Indian's method of maintaining his caste is by the exercise of care as to bodily contact with persons outside it. He preserves purity of descent by observing conventional rules as to the choice of a wife, and the purity of his person by the observance of certain other conventional rules of society all aimed at the avoidance of personal contact with outsiders. Such rules can only be carried out in their full strictness where individual life is stationary in character, and movement is performed in a conventional, leisurely, and ample manner. European civilization, however, has introduced successively the metalled road, the steamer, the railway, and the motor-car. The means of locomotion have become progressively cheaper and more rapid, and have been brought more and more within the reach of the average citizen, while the conditions of

By increased ease of movement.

travel by steamer and railway have made the old caste isolation wellnigh impossible. The facilities for movement have also rendered it easy for the ordinary individual to get away from the environment that makes obligatory the conventions of caste, and have thus tempted him to do so on a considerable scale. Further, the much reduced cost of visits to European and other countries, where obedience to caste rules is not only extremely difficult but is in most instances impracticable, has brought the advantages thereof to the notice of all sorts and conditions of men, and at the same time indulgence in such visits has made the old-time caste restrictions so intolerable as to cause them to become increasingly neglected. Here, too, natural and therefore irresistible forces are at work, for the action of which no one is responsible.

Orthodox reaction: unrest.

But these two conditions—the destruction of the belief in purity of caste pedigrees and the inability to preserve personal isolation—have brought about an inevitable struggle between orthodoxy and heterodoxy: a struggle that is very real, that involves the acceptance of new social habits and a new outlook on life, that cannot but upset many notions and ideas which age has made almost instinctive, that must bring about the most serious trouble before the resultant peace can be achieved, and that no observer of the things Indian of to-day should overlook or attempt to ignore.

Modern Hinduism.

Hinduism is something more than a form of religion, for it connotes the mental attitude towards life in a certain sense of the whole indigenous population, and even where, as in the case of the Muhammadans, it does not control ideas as to correct conduct, it strongly colours them. The Hindu's pervading religious and social authority arose out of the same primitive Animism as the Western religions, but it had a development all its own, through the work of indigenous priests and philosophers of many generations. By the time of the Muhammadan conquests in the thirteenth century A. D. they had produced between them, unaided by outside influences to any appreciable

extent, several types of theistic belief, which as regards the populace took the form, in varying degrees of haziness, of faith in a Supreme Deity, and concurrently in innumerable supernatural powers as practical helpers in difficulty and trouble. Hinduism was at that time, in fact, a deistic philosophy superimposed on Animism and accompanied by conventions and practices that had grown round both theories in the course of many centuries. When therefore the Muhammadans arrived with their monotheistic faith, also superimposed on an ancient Animism but accompanied by a totally different set of customary practices, their attempts at wholesale conversion by both civil and military measures did more violence to the conventions of Hinduism than to the belief. In the centuries following the advent of the Muhammadans the way was thus paved for a series of popular sectarian reformers of Hinduism, whose eclecticism freely admitted the tenets of Islam into their ostensibly Hindu teaching. And when once the effects of the cataclysm caused by the fanaticism of the invaders had passed away, Hindu and Muhammadan were able to live together in comparative peace and to borrow religious practices from each other. Then came the fifty years of Aurangzeb, the fanatical Moslem missionary invested with imperial power and capable of using it; and after him the other fifty years of general anarchy immediately preceding the events leading up to the Battle of Plassey in 1757, brought about by his consistent but misguided attempts to convert all India to his sect of Islam. This one century had a ruinous effect on Hinduism as an authoritative rule of life. Scholarship sank low, and Hinduism became a coarse, ignorant ritualism, covering a grossly immoral idolatry, filled with animistic beliefs. Such was the Hinduism that greeted Christianity in the first days of British rule. One result, however, of the gradual extension of British power and of the concurrent Pax Britannica over the whole country has been to revive the influence of the old philosophic schools among the educated, and to bring the doctrines of Christianity to bear on the masses, vaguely affected by

the ancient philosophies, and deeply imbued with the Animism of their far-distant forefathers and with the monotheistic teachings of the popular reformers. On the whole, therefore, Christianity, like Islam, does more violence to the forms and practices than to the beliefs of modern Hinduism, meaning by that term the unprofessed faith of the population generally.

Influence of Christianity: unrest.

Christian teaching cannot in the circumstances be expected to have much effect on the Hindu proper, that is, on the man belonging to a caste of recognized social standing. But under the Hindu system as controlled by the Brahmanic or priestly caste, ages of conquest from without and internal war and conflict have produced the classes known as the low castes, outside the pale of orthodox Hinduism, but necessarily a large and numerically important part of the general population. On such as these Christian moral and social ideas, in combination with modern elementary education and the equality before the law inculcated by the British Government, could not but have a direct effect, and the result has been unavoidable—a great upheaval from below and a general rise in the social status of those customarily regarded as the lowest. It is equally unavoidable that this condition of things should be extremely distasteful to those higher up in the social scale. Here once more antagonism of a serious kind is being created by natural causes.

Revival of orthodoxy.

This antagonism has so far shown itself in a widespread revival of Hindu orthodoxy. The unconscious attack of Christianity, in Hindu eyes the more insidious for its very want of conscious direction, has alarmed the conservatives and roused the castes to a grave sense of danger to the ancestral faith, inducing the educated to band together in various societies and sects, which have in common the point of being anti-Christian. Their main object is to prove that Christianity is unnecessary, in that Hinduism is as strictly monotheistic and is possessed of an equally lofty and practical morality. So great and general is the fear of the influence of Christianity on the people, that similar protective movements are taking place among

the Muhammadans, Jains, and Parsis, and also among the Buddhists in Burma. Shortly, the socio-religious condition of the whole Indian Empire, arising out of causes beyond control, is that of two opposing elements fighting for supremacy: a strong tendency towards the absorption of unorthodox influences from outside, combated from within by a vigorous orthodoxy.

Western education.

In 1800 the School of Oriental Languages for young civil servants was founded at Calcutta; in 1813 missionaries were admitted into India as freely as the servants of the East India Company; in 1835 the press was given complete freedom for the first time; in the same year state-controlled education was given an English turn; and in 1854 a wide and comprehensive scheme of both elementary and higher education in the vernaculars and English was put in motion. All these acts have not only vitally affected the people of India, but were performed long enough ago for the effects to become visible, at any rate in some considerable degree. The Oriental School secured a knowledge of the people for the European administrators and officers: the missionaries initiated a vigorous campaign of education in all directions, taught the people the necessity of examining their religious and social practices, and thus led them to reform; and the education charter gave an impetus to native activities which is even now incalculable, for it has raised in great numbers a middle class, never before seen in India—the educated man of no prominent social position. But it will be seen that all this spells unrest where a whole people is concerned. A real and not a superficial knowledge of a general population, acquired by themselves and by those who deal with them, is at first disconcerting; all reform involves opposition, and religious reform the most determined; and the natural mental attitude of the components of a newly educated class is discontent with the social conditions of their day, which must continue until they find their level in the economy of life.

The forces for unrest.

Generally speaking the press in India, native and foreign, has always been, as elsewhere, the follower and not the

The press.

leader of the views of those who maintain it, and has therefore acted as a powerful fan to the flame of unrest arising from the causes above mentioned.

The modern educated man.

The consideration that makes the education policy of the British Government of India so all-important is that it is on this very class of inflammable educated men that the future of the country chiefly depends. 'They are marked by their English speech, by great enthusiasm for education, a passion for self-government, a desire for economic progress, a new attitude towards women, fresh humanitarian feeling, and a consciousness that the new India of their dreams cannot be brought in without many reforms.' So has said most truly an acute non-official observer of things Indian (Farquhar, *Primer of Hinduism*, second edition, p. 152), and it will be seen that the word 'unrest' is written large across every sentence, an unrest that is unavoidable, because it arises naturally out of natural causes.

Loyalty and disloyalty.

The British Indian educational system has produced two varieties of the educated man. There is the man of the type of the late Mr. Justice Ranade of Bombay, a Maratha Brahman, who began by initiating a religious foundation, the Prarthana Samaj (Inquiry Society), and ended with the Social Reform Movement, with its organ the *Indian Social Reformer*. Such a product of specialized education is of the kind that does good in his generation, reforms without revolution, and makes for stability of government. But there is also the man of quite a different type, forming unfortunately in his numbers a large class. All the state-guided education, whether elementary or higher, has been practically free, open to all and every, and entirely undenominational. The application of these principles on an immense scale has created a highly-taught national youth without those wholesome home influences that build up a sound moral character and secure suitable occupation in later life. The result is widespread discontent with the conditions of life, born of disappointment and disillusion, uncontrolled by stability of character, and leading straight to unrest and rebellious ebullitions. To

use very general terms, just as the National Movement may be taken as the natural sign of loyal social evolution in modern India, so the National Congress may be taken as that of the disloyal.

The forces against unrest: the modern native ruler.

Here then are two tremendous social forces at work, created by British state education: the one steady in character and loyal to the government that created it, and the other whose chief characteristics are unsteadiness and disloyalty. But there is a third result of the British system, which is as important as the other two and makes directly for peace. The modern native ruler, 'in subordinate alliance' with the government, in one way or another almost invariably owes his position to the British power and is politically dependent on it, and it should be remembered that such princes control about one-third of the whole Empire. At the present time the native ruling families are the product of British Indian education, and are practically English gentlemen, brought up in the English fashion, with many ideas and instincts in common with their corresponding kind in England. It is to their political interest to be loyal and to check unrest, and when considering the manifestations of social discontent brought on by the educational system and by fear of danger to caste and the indigenous religions, it must always be borne in mind that any kind of unrest arising from time to time has permanently a very powerful opponent in the native ruler.

The Parsi

There are other classes in India, which, though comparatively not large as yet, still wield an influence that cannot be overlooked in an appreciation of social life at the present day. The most influential of these are the Parsis, a very small, almost minute community, of Persian descent, which has raised itself by energy and intelligence to great power in the land. Though established in the country for some 1,200 years and much mixed up with it, even to the loss of their original language, they are still foreigners, and as such their fortunes are bound up with those of British rule. They are steadily becoming more and more immersed in European culture, and their

political position, combined with their high mental faculties, makes them a force on the side of loyalty to the British Government, working to guide unrest towards the paths of peace.

The Jew. The Jews in India are, in places, of still longer standing by some centuries than the Parsis, but they have not reached that social importance which characterizes the race in Europe. They too, in the main, have remained in India, as in many other countries, essentially foreigners in the land of their adoption, and though they cannot be reckoned a prominently influential force in the evolution of modern Indian society, they wield that power which comes of obedience to the law of the day and of inoffensive conduct, for it is a fact worth noting that no member of this community has ever found his way as a prisoner into the great Indian penal settlement of Port Blair in the Andamans.

The Armenian. A foreign community still more minute than the Parsis, but this time of Christian origin, is to be found in the Armenians settled in India. Here again, energy and mental capacity have made an infinitesimal body to be of serious consideration. This is no new story, for nearly three centuries ago in the days of Jahangir and Shahjahan, the Armenian Gonsalvo Melchior (Mirza Zu'lkarnain) and his family held posts of commanding influence. Nowadays the Armenians have so completely thrown in their lot with the British Government as to make English their mother tongue. Here, then, there is a force on the side of good order, which, however unobtrusive it may be, has to be reckoned with in estimating those naturally opposed to unrest.

The native Christian. Broadly speaking, all Christian communities act like the Armenians, as checks on the unrest arising out of the social subversion caused by British dominance over India. Of these there are two distinct kinds : the native Christians and the Eurasians, or Anglo-Indians as nowadays they prefer to be called, to the great confusion of Europeans who have long used that term in a totally different sense. The native Christians are, from the nature of things, of

the humbler classes of society, and though they are becoming numerous, are destined in the near future to increase largely in number, and are in many places of long standing: they have no political authority or influence of any consequence as yet, but what they have is against political firebrands in the sense that they are outside the agitators' purview, and may be reckoned on to oppose them in any conflict with law and order.

The Eurasian (Anglo-Indian).

In the case of the Eurasian, to use the familiar term for the population now officially called the Anglo-Indian, the new name given it at its own insistent request, is the strongest possible indication of its political proclivities. It was always ardently British in feeling, and now by its very title it has definitely and publicly thrown in its lot with the modern foreign rulers of India. This Anglo-Indian community is chiefly, though by no means entirely, of mixed European and Indian blood. Legally a domicile of three generations in India turns any child of pure European descent into an 'Anglo-Indian', and amongst the humbler grades of society this class is increasing in numbers to an extent that is perhaps not fully brought out in census returns. Next to these is a large class in which the infusion of native blood is very small, where pure Europeans settle in India and generation after generation successively marry women with some Indian blood in them, perhaps but little. After them comes a still more numerous class, where the marriages have been the other way, producing an ever-increasing infusion of native blood in the children. Then there is the 'half-caste' pure and simple, the child of a European by a native woman, a type which does not in any way predominate in the Anglo-Indian community; and lastly, there is a numerous variety, which can boast of no European blood whatever, pure-blood descendants of pure-blood native converts to Christianity in days now long gone by. These are chiefly to be found among those who bear Portuguese patronymics, sometimes much corrupted, because the custom was for the christianized followers of Portuguese nobles and other prominent residents in

India to assume their surnames, a custom once observed elsewhere to a small extent by the dependents of well-known British, French, Dutch, and other European merchants. Many such families of purely native origin have merged into the general category of Eurasians because of their Christianity.

Attitude towards British and Indians.

Europeans of all ranks and positions in life, and of all degrees of wealth have raised up Eurasian families, so that in this community are included families of every social grade and of all positions in society as to wealth, education, and influence. But they have two points in common: an allegiance to the British name that is pathetic in its devotion, and an antagonism to the Indian which is derived from the peculiar pride of birth—that instinct of the necessity for holding together—that is to be observed in all races or communities spurned or looked down on by those among whom they have to live. England is 'home' to them all, however hopeless the prospect of beholding it with their own eyes may be. So they condone superciliousness in the British-born subject of the King-Emperor of India, but deeply resent contempt from the caste-ridden native, and on any occasion of attack on the British power the whole weight of this community from the highest to the lowest would be at once thrown on the side of the English, just as it was in the Mutiny.

Indian women.

In the Indian Empire women lead their lives under two incompatible sets of conditions, the free and the confined. To the former class belong the Europeans, the Anglo-Indians, the Christians, the 'low-castes' and more lately the Parsis, and in Burma practically the whole female population. The Parsi women are nowadays wholly emancipated, but some of the leaders of the movement that gave them freedom are still alive; and in Burma the freedom is by old custom as absolute as it is anywhere in the world. It is so much valued that for the sake of it the eclectic Burmese women, who freely marry men of any nationality, insist on bringing up their daughters as Burmese, though they raise no objection to their

sons following the manners, dress, and customs of their fathers. The freedom of the 'low-caste' natives of India is practically restricted to that of movement, the economic conditions of their lives making it impossible to regulate otherwise, but there is always a tendency to copy the higher castes so far as circumstances will permit. Seclusion of women may be said to be the rule, not only in the higher castes, but also in all those classes that like to term themselves respectable. The custom, however, is not indigenous to India, and was copied by the Hindus from the Muhammadans soon after the first irruptions of the latter some seven hundred years ago, largely as a measure of self-defence against inroads on families by the invaders. First the sense and then the instinct of personal danger arising out of the origin of the custom amongst the Hindus have served to make those subjected to it extremely tenacious of its preservation. Socially it has created a very large number of women whom confinement has rendered unable 'to take care of themselves'. Seclusion.

In the dim beginnings of the history of Indian society, marriage in the case of girls appears as a ceremony of initiation into the special family or clan cult, and later on into the caste, just as the assumption of the sacred thread was in the case of boys, leading long ago to the marriage of the girls before puberty in order to secure them for the caste. About the same time the prohibition of the remarriage of childless widows arose as the female form of the asceticism then commonly practised, which was extended some centuries later, soon after the beginning of the Christian era, to the remarriage of widows in any circumstances. Long afterwards, in the seventh and eighth centuries A.D., it became common for widows to be burnt along with their husbands' bodies as a supreme act of asceticism, or as an alternative to be subjected to a hard ascetic life. *Sati*, disliked and prohibited by the Muhammadan rulers, was put down definitely by Lord William Bentinck in 1829, but child-marriage, widow-celibacy and widow-asceticism still last on, despite the Act of 1865, legalizing widow-remarriage. It cannot, Marriage, infant and widow.

however, be too clearly understood that these conditions as to the treatment of widows are not now and have at no time been the general rule in India. They apply only to a limited though important part of the population.

Female infanticide.

Female infanticide is another practice which has grown out of caste customs in relation to the marriage of women, has proved an obstinately troublesome question to deal with, and is of great consequence socially. For reasons that need not be detailed here it has become not only a difficult but a prohibitively expensive matter for parents in some positions in castes to find husbands for their girls. From this economic cause arose the custom of killing off the girl babies, and because it is an economic question touching the people concerned in a vital point of family finance, the steady pressure of so powerful a government as that of the British ever since 1830, when the campaign against it was begun, has not yet availed to stamp it out entirely.

Forces for unrest among women.

All these points of controversy, emancipation of secluded women, abolition of child-marriage, and remarriage of widows, are to a large portion of the population at the present day burning questions, which have in their favour a strong backing, even amongst the most highly placed; and there are unmistakable indications that the still existing barriers are breaking down, and that the efforts of those endeavouring to bring about the new conditions will eventually succeed. To these questions must be added that of female education. There is nothing in the history of India which shows that there has been any previous tendency to see a necessity for this, but under British supremacy it is permeating everywhere and providing an unquestionable force from within in favour of the movements above mentioned. Add all this to the abolition of *sati*, and the suppression of female infanticide, and it becomes evident that under the surface there is proceeding among the women an equal degree of revolutionary change in the regulation of life throughout the whole country as among the men, which is distinctly

though unintentionally assisting in the creation of a period of general unrest.

The modern villager.

Outside the pale of the society which is deeply troubled by the causes of change and uncertainty, and only affected by them vicariously, lives the Indian villager, the largest class of all; an observation which does not infer that those within the pale do not form an immense population. But even here there is one matter, resulting from the modern western system of government, which does great violence to ideas and habits rooted in the far-back centuries. Sanitation is laying its hand on the Indian village more and more heavily and widely every year. Vaccination has been enforced long enough for its benefits to be recognized. Prophylactics against fever are also a generally acknowledged benefit. But inoculation and other means for staying plague are still novel, and the necessity for a pure water-supply and for uprooting village dunghills strike at age-old prejudices, especially at the quasi-religious idea that water in any form purifies. Whenever old-world prejudices are hit there is trouble and violent opposition, and so even in the village, however unavoidable and necessary, there is an active cause for unrest in western sanitation.

Sanitation a force for unrest.

Forces for and against unrest.

On a survey, therefore, of the disruptive social forces that are concerned with the obvious unrest in India at the present day, the observation is irresistible that though they are very powerful, most serious, and unavoidable, they do not at all hold the whole field, and have arrayed against them other forces by no means negligible. The present conditions are bound to settle themselves by ordinary evolution, and statesmanship in the matter seems therefore to resolve itself into the simple and trite directions of watching local symptoms, encouraging loyalty and checking rebellion. In this view there is required by way of statecraft nothing more heroic than patience, courage, and a cool head.

Social relations: Europeans and natives.

The social relations of a ruling race with the ruled and towards each other are always an important matter. In regard to the first there is an old criticism of the attitude

of the European towards the native, which is only too often condemned as a cold superciliousness. This is, however, a shallow observation. The difficulty in mixing socially arises from two causes, in both of which European women are greatly concerned. They are, firstly, the immense difference between eastern and western personal habits; and secondly, the seclusion of all the upper-class women combined with the social barriers set up by the caste system. Briefly, the position can be stated thus. In the aggregate European women will not admit to full social privileges Oriental men who deny the society of their own wives to European men. It comes to this; free social intercourse is impossible where men cannot dine together, or where the wives of one of the parties cannot socially receive the men of the other. In this matter it is not the cause but the fact that counts. Europeans in India are for the practical purposes of society willy-nilly a caste, and as a caste they have the same business and general social relations towards all the other castes as these have towards each other.

Mixed marriages: European women.

The matter of differences in manners and social instincts is of some consequence in this connexion as gravely affecting marriages between European women and Orientals, which are practically always a mistake, for this reason: women, from obvious causes, are bound by surrounding social conventions to a much greater degree than men, and breaking through the barriers of their natural environment is consequently a serious matter, leading almost invariably to trouble and to subsequent personal unhappiness.

Official and non-official Europeans.

In regard to the relations of Europeans towards each other, the old-time antagonism between official and non-official society is fast disappearing. Society is no longer marked by a dividing line separating those in and those out of government employment. The Indian Warrant of Precedence is still indeed strictly official, but the fact just mentioned is recognized by a footnote that the Warrant applies only to those mentioned in it, discretion being thus given to local controlling authorities to accord

the precedence they think right to all outside it. The late general rise in prices and wages, and the grave fall in the gold value of the rupee, have tended to lower the spending power of the official classes with homes in England, and at the same time the increase in the wealth and natural social status of the non-official classes have improved their relative position, and thus what have hitherto been two opposing factions are coming nearer and nearer to a footing of equality as time goes on. With the recognition of this fact has come acknowledgement of the value of the work done for the public good by the missionary, the banker, the merchant, the planter and the professional man. So that European society in India is steadily settling down to the same gradations as prevail in England from time to time.

The social situation in modern India.

In summarizing the modern social situation, which has arisen in India in consequence of the pressure of western influence, one may perhaps best describe it, to use a familiar simile, as being in a melting-pot heated by the burning fiery furnace that must ensue on a close contact betwixt East and West which is still fresh—while an irresistible force is still impinging on an immovable body. Neither can be destroyed, and the ebullitions in the melting-pot will settle down on the contents becoming sufficiently amalgamated. There is no inherent danger in the situation if handled with discernment, except that due to human error—the liability to adopt a policy that proves disastrous—and that is a matter in the hands of fate.

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CHAPTER IX

THE MALDIVE AND LACCADIVE ARCHIPELAGOES

By Professor J. Stanley Gardiner

§ 1. *The Maldive Archipelago* [1]

Formation of coral reefs.

The Maldive Archipelago, to the south-west of Ceylon and due south of the Laccadive Archipelago, forms geographically one of the most interesting regions of the world, because the vexed question of the formation of coral reefs has largely hinged on its topography. These reefs are found in the oceans round the tropical belt of the world from 30° N. to 30° S. lat., being most abundant in the Pacific and Indian oceans. They may fringe the shores of tropical lands, or they may form barriers off the land, many miles to seaward. Most characteristic of all are reefs isolated in the oceans in the form of rings, much bent, perchance, but their outline clearly marked; these are called atolls after the word 'atolu', the sole universally accepted Maldivan contribution to scientific literature. Charles Darwin supposed that such atolls formed the sites of submerged land, and that the coral animals, as the lands subsided, kept building up their surface reefs to the level of the sea. Others say that the reefs have grown on mounds of the sea floor, or have been founded on the ashes and cinders of submarine eruptions, cut down by the waves below the surface of the sea, or even on foundations formed similarly from more firmly consolidated islands. They further state that these atolls are ever growing seaward, like fairy rings, while the spaces of water enclosed by them, the lagoons, are enlarging, keeping pace with their growth. The surrounding

[1] The account given in this chapter is based largely on the author's own observations and work in this group. Previous accounts of the race and its ethnology deal mainly with Malé, which is by no means characteristic of the Maldives generally.

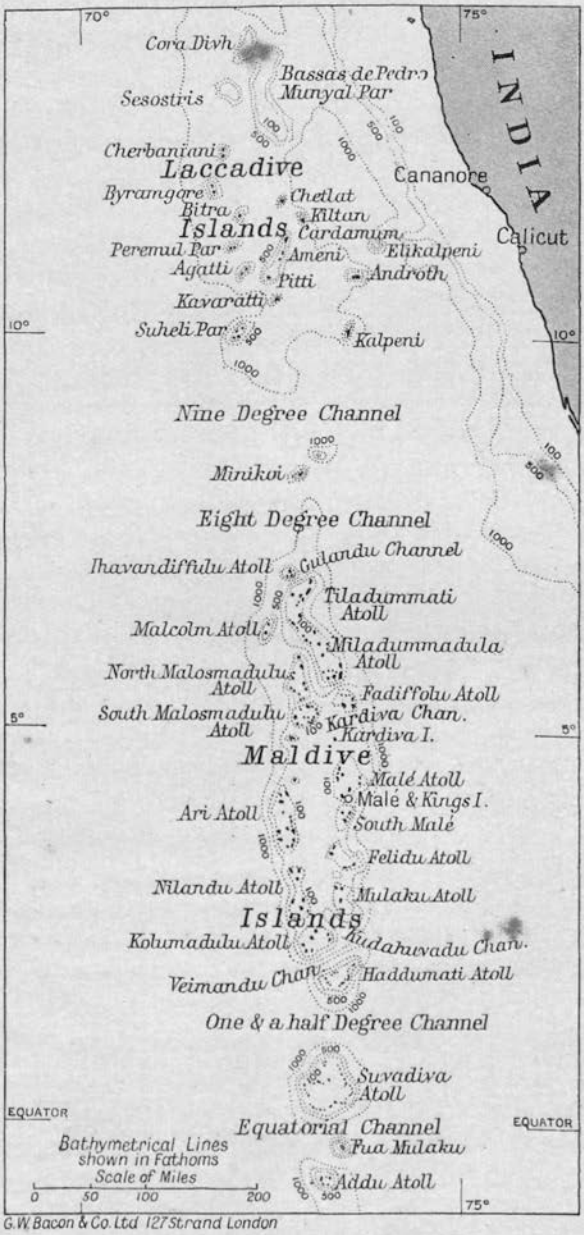

FIG. 13. The Maldive Archipelago.

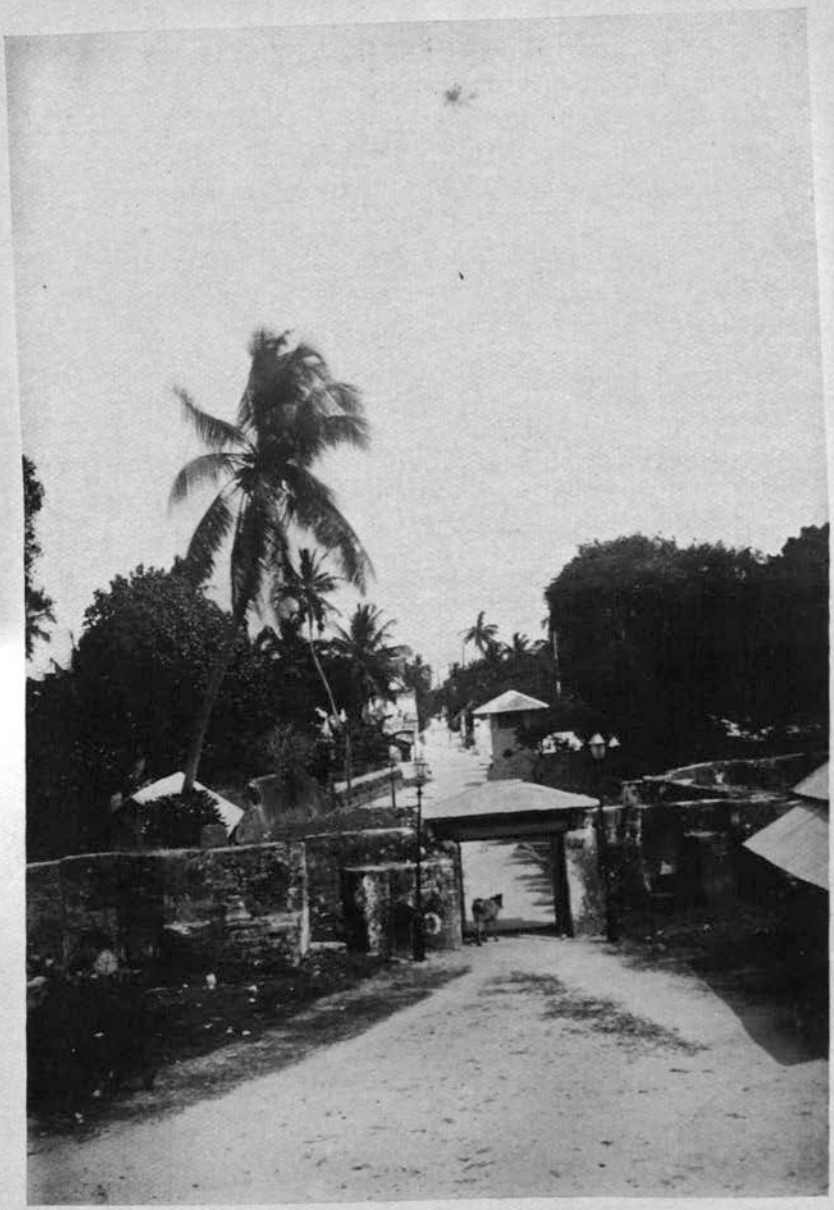

PLATE XIII. THE CHIEF STREET IN MALÉ, MALDIVE ISLANDS

(Phot. Professor J. Stanley Gardiner)

rings of reef are in large atolls broken by passages or channels, their depths and those of the lagoons varying with the size of the atolls though the depths of neither exceed 50 fathoms. The lagoons form protected anchorages, harbours for the largest ships, but their navigation is difficult as they are much broken by shoals and patches of reef. It suffices further to say that Darwin's views, after holding the field for half a century, are not accepted as generally applicable by those who in recent years have made extensive studies of coral reefs, and that their opposition is largely founded on investigations in the Maldive Archipelago.

Extent and principal islands.

The Maldives form a great group of atolls extending between 7° N. and 1° S. lat., through about 480 miles. They form a narrow line, nowhere more than 70 miles across on either side of long. 73° 10′ E. The line consists of single atolls to the north and south, but a double chain in the centre, suggesting an elongated atoll with a lagoon upwards of 200 miles long. The distances between the atolls in the chains vary, but they lie close to one another down to Haddumati in lat. 2° N. Farther south is the One-and-a-Half-Degree channel, about 50 miles across. Next lies an immense atoll, Suvadiva, about 42 miles across, followed by the Equatorial Channel likewise of about 50 miles. South of all is one of the smallest atolls, Addu, which has relatively far more land than any other atoll in the group, while in the middle of the Equatorial Channel is a small coral island almost completely covering a surface reef, Fua Mulaku. Seventy miles distant to the extreme north lies the atoll of Minikoi, which politically belongs to the Laccadive Archipelago, though it is inhabited by a people of Maldivan race and has closer topographical relationships with the Maldives. Farther north lie the rest of the Laccadives, while 240 miles south of Addu the Chagos Archipelago begins.

Physical conditions.

While the general depth of the Indian Ocean is about 2,500 fathoms, the Maldives and Laccadives form a marked horn at half this depth with a gulf of deeper water between them and the southern part of the Peninsula of India.

There are depths of about 1,200 fathoms north and south of Minikoi, in the One-and-a-Half-Degree and the Equatorial Channels, and also between Haddumati and Kolumadulu, the southern atolls of the central series. Thus the foundation of the whole line is a plateau extending out from India at 1,250 fathoms in a general depth of 2,500 fathoms. Addu, Suvadiva, and Haddumati rise steeply as farther plateaux to about 50 fathoms, and on these the actual ring reefs and shoals stand up to the surface. All the other atoll reefs rest on similar plateaux at similar depths, but there is an intervening plateau at about 200 fathoms: thus they have three plateaux at about 1,250, 200, and 50 fathoms for the support of their actual reefs. This arrangement is unique in groups of purely coral islands, and requires explanation in any consideration of the origin of the archipelago.

The atolls.

The lagoons of the individual atolls have depths of 20 to 50 fathoms, and their encircling reefs are well marked in the southern atolls, forming single well-defined lines of surface flats with islets along them. As an examination proceeds northwards, however, these surface flats are seen to be commonly hollowed out in their centres for pools of deeper water. In effect, the rim of the atoll consists itself of a series of smaller atolls, or *faro*, to borrow a second name from the Maldivan language. Lastly, in the Tiladummati-Miladummadula atoll the rim is not nearly so clearly defined, the whole consisting of a plateau at 40 fathoms with a series of surface reefs and *faro*, most of which, however, lie towards the seaward edges of the bank. This atoll is fairly open in its centre, but the lagoons of atolls in intermediate conditions have commonly many surface shoals, in some cases such a jungle of reefs that navigation between them is almost impossible.

Rocks.

The land consists of islands, for the most part scattered around the encircling reefs of the atolls, but there are some islands on shoals in the lagoons, especially in the northern atolls. The land in few places reaches more than 20 feet above the sea. It generally consists of

coral rock to seaward, backed by sand against the lagoon. The rock is similar to that which forms the reefs, but broken up by weathering, while the sand is drift-sand, though it never forms dunes. Both are pure coral limestones, no other rock being found. The islands are subject to the regular north-east and south-west monsoons of the Indian Ocean, and are farther south than the usual track of cyclones. They exhibit considerable changes in the two monsoons, in many places sand being drifted up in one and washed away elsewhere in the other. Isolated rocks, too, are found here and there on the reefs, many showing where land once existed. On the whole the land is gradually disappearing, and the amount of loss even in historical times has been very considerable.

Climate.

The rainfall may be estimated at about 50 inches to the north of the group and 150 inches at Addu; it is collected for drinking purposes in most inhabited islands as it runs down the stems of the coco-nut trees, the people otherwise depending on slightly brackish wells, in many of which tidal movements are visible. The climate is that of similar regions in other parts of the world: equatorial, moist, and equable, with a mean temperature of about 83° F.

Flora.

All islands that have any available ground for vegetable growth are more or less covered with plants, often with a dense jungle of the same general type as the coast jungle of south-west Ceylon. Coco-nuts have been cultivated from time immemorial, especially on the coral rock, while much of the sandy land has been cleared for the various hard grains of India. The coco-nuts give an elevation of about 100 feet to most islands, while below them is often a rich growth of hartstongue ferns and low lianes. Occasionally, dome-like banyans tower up for 30 feet or more above the coco-nuts. In Addu and Suvadiva are swamps with rushes, where snipe and a few marsh plants are found. Mangroves occur, but there are no considerable swamps. The whole flora numbers 284 species, of which three-sevenths are cultivated plants of

India. The wild flora comes from the same region and is only interesting in view of the means of dispersal of plants and of their order of appearance and competition on new islands.

Fauna. The fauna is like the flora, purely oceanic, and of course closely correlated with the flora, as depending upon it for food. Fruit-eating bats occur in some numbers on the banyan trees, and there are also rats and mice. There are no true land-birds, but swallows, wading-birds, and other migrants pass through the group; the crab-plover also is found. There are a few lizards, and turtles are not uncommon. Insects and spiders have come with cultivated plants, or have drifted over the sea; mosquitoes, both the malarial and others, abound. There is not a single land-beast of purely continental type. As to the marine life the number of forms is enormous, but they are all of types found throughout the Indian Ocean.

History. The history of the Maldives is geographically interesting as it involves to a large degree the history of races, sects, and communications in the Indian Ocean. The early history is lost in obscurity, but Ptolemy in the second century alludes to the existence of a multitude of islands, said to number 1378, over against Taprobane, or Ceylon. In the fourth century the Emperor Julian received ambassadors from the Serendivi or Sinhalese of Ceylon, and the Divi or islanders. In the sixth century Cosmos the monk refers to the islands about Ceylon, particularly to their being 'set close' to one another, an allusion which can only apply to the Maldives. Suleiman, the Arab, in the ninth century, speaks of a line of islands to the east of the Arabian Sea as producing ambergris, coco-nuts, and cowries, and *being governed by a woman*. In the eleventh century they are referred to by Alberuni, under the name Diva, but it was left to Abu Abd-Allah Muhammad, a Moor of Tangier, generally known as Ibn Batuta, to give the first authentic account in the course of the narrative of his thirty years' wanderings (1324–1354).

Early religions. The Maldivans were probably Hindu or Buddhists at

the beginning of the Christian era, as the remains of dagobas exist in several islands (Ghang, Landu, Fua Mulaku, &c.). Then according to the legendary stories they became Christian, but were much troubled by dzhini. Sheikh Yusuf Shamsuddin, of Tabriz, is supposed to have converted them about a hundred years before the time of Ibn Batuta, and his mosque and grave are shown at Malé. He also introduced Arabic characters, and from his time a national record has been kept by the people themselves. Ibn Batuta was known to have been *Kazi* of Delhi, and this office was pressed on him for a year in the Maldives (1343). His account mentions government by a Sultana and trade, similar to that of the present day, with the Coromandel Coast, Ceylon, and Bengal. The next allusion is that of Abd-er-Razzak, who mentions in 1442 the merchants of Diwa-Mahal as frequenting Ormuz, an account supported by the Maldivan statement that the sovereign title of their ruler was conferred by a caliph of that region and by their stories of early connexion with Persia.

Portuguese relations.

Hieronimo di Santo Stephano, a Genoese merchant, weathered the south-west monsoon of 1497 in the group, and next year the Portuguese reached India. Five years later four Maldivan vessels were captured by Vicente Sodre, and sold at Cananore. The Portuguese required coir rope for their rigging, and guaranteed the island trade to Mamallé of Cananore in return for a payment in coir. In 1519 they had to interfere on account of pirates of their own nationality using the Maldives, and Malé, the capital, situated about the centre of the group, was occupied in 1519 for a short time, a small fort being built. In 1554 Malé was again occupied, the island being fortified by a wall with bastions, built of worked coral rocks, mounted with numerous cannon; some of the latter remain, and these fortifications, still completely intact, are the chief feature of Malé at the present day. The higher-caste natives fled to Addu, the people of which are treated now with a peculiar respect in the group, and have the privilege of appointing the *kazi* (the religious

head) of the group who installs the Sultan. Some attempts were made to convert the people to Christianity, but these attempts came to an end in ten years, when Malé was recaptured, the Portuguese garrison being put to the sword. The group has since retained its independence, though Malé was sacked in 1607 by a native expedition from Bengal.

The *Corbin*, a French vessel, was wrecked in 1602 in Goifurfehendu atoll, and on board was a young merchant, François Pyrard de Laval, who was detained at Malé for five years. His account of the group is detailed, though much is superficial and more inaccurate. It is peculiarly interesting as picturing a condition not far removed from that of the present day.

Dutch relations.

With the cession of Ceylon to the Dutch the Portuguese relations with the Maldives were also transferred. In 1645 began an annual embassy to Ceylon, which has continued to the present day. The Maldivans describe this as an offensive and defensive alliance with the Dutch, annually renewed. Save for constant irruptions of Malabar pirates and a war with Cananore, history records no important events for a century, when more intimate relations were assumed with the Dutch. In 1754 Malé received a detachment of the allied French troops, which was recalled five years later. Disorder then broke out and a noble seized the sultanate, under the title of Ghazi Hassan Izzuddin, founding the present reigning family. Many of the nobles retired to Suvadiva and Addu, which remained independent until the time of Sultan Mohammed Imadudin, in 1842.

British relations.

In 1796 the alliance with the Maldives passed with the Dutch settlements in Ceylon to the British, but there was no interference. In 1834–36 Captain Moresby, of the Indian Marine, prepared the present charts. On his departure he left Lieutenant Young and Mr. Christopher at Malé, their stay resulting in another valuable account of the group. Mohammed Imadudin had now become Sultan (1835), and he reigned until 1882. He was a great ruler, and to him was due the consolidation of the group

and the restoration of Suvadiva and Addu. He strictly enforced the Muhammadan law (except that he only countenanced monogamy), put down internal warfare, abolished slavery, organized trade and administration, and turned the people into a quiet and peaceful race; all remains to-day as he left it. Since his death there have been several sultans, each noble having a candidate of the sultan's family. Recognition for each new sultan has been asked from Ceylon, so that the relationship with Britain has passed into a more definite suzerainty, important on account of the geographical position of the archipelago. The present writer cruised for ten months in the group in 1899–1900, and visited nearly every atoll in a Maldivan vessel with a crew of natives, after having spent upwards of four months with people of the same race in Minikoi. Lastly, Professor Alexander Agassiz spent a month examining their coral reefs in 1901–2, in the British India steamer *Amra*, his work establishing the deep plateau formations of the archipelago.

Government.

The government is theoretically in the hands of an absolute sultan (*Rasgefanu*), but it is in reality an oligarchy of certain families at Malé, with a sultan always chosen from one family. After the sultan come his male relations (*manipul*) to the third generation in descent from a sultan, all eligible for the sultanate. These are followed by five 'life peers' (*kiligefanu*) which to some degree are hereditary, three *manikofanu* or chief wazeers, and three *thackarufanu* or lower wazeers, the last alone being chosen without consideration of caste. The above form the Great Council (*bodun evun*), which theoretically advises the sultan. The power now is in the hands of a few members of the *bodun evun*, whose opponents are carefully excluded, though their property and lives are respected. The *manipul* form a real caste, and after them there are the *didi*, the descendants to the seventh generation from a sultan, and the *maniku* to the eleventh generation; both can be renovated by marriage with the daughters of *manipul*. Then there are the *tutu* and *fulu*, terms applied largely to small landowners and chiefs in the

atolls more distant from Malé. The term *kaleo* is applied to the ordinary people, while that of *ravere* is used for the drawers of coco-nut toddy (from which sugar is made), who have no rights in land or trees, being in origin descendants of slaves, principally negro. The one person of independent position is the *kazi* or chief exponent of the law of Muhammad, to which office the head of the chief mosque in Addu succeeds. The sultan has his palace at Malé, which he now seldom leaves; the last sultan went to Ceylon, *en route* to Mecca, and in his absence a fresh combination of *didi* took place, leading to his deposition. He has 100 soldiers, with some sort of weapons; and 500 servants or *thackaru*, who do any work which may be ordered. He is attended by considerable state, especially at his ceremonial games—sword, spear, quarter-staff and rifle—held on religious feasts.

Provincial division.

The islands are divided into fifteen provinces or *atolu*, each under its *atoluveri*, whose business is to settle all serious disputes; he also looks after the tribute to the sultan, a basket full of cowries per man. Generally they are *didi* and live in Malé, being paid by percentage. The separate larger islands have each a *katib* or ruler, *naib* or judge, and *mudim* or head of the mosque; but in smaller islands the two first may be absent. Their pay is a small percentage of the yield of fish and coco-nuts. The produce of most of the islands belongs to its inhabitants, but in every atoll, except Addu, there are islands owned by people of high caste living in Malé, who are supposed to receive three-fifths of their produce. To some degree the inhabitants of each island meet together to settle matters of common interest.

Settlement, products, trade.

Most of the larger islands are inhabited, the village surrounding a mosque, which is often an elaborate structure of carved coral stone (*Porites*) from the reef, roofed with thatch of coco-nut leaves. There is always a well, but some islands have elaborate tanks. The mosque is surrounded by its graveyard, with oval-shaped upright carved gravestones, and usually some sweet-smelling flowers. Small shrines abound, marked by

offerings of flags; they serve 'for the visits of the souls of departed saints'. The houses are mostly of wood, with coco-nut thatch and walls, the better with palm-leaf enclosures, though there is no seclusion of the women except at Malé. Chickens abound and run semi-wild, but goats are scarce, and cattle only exist in Malé. Pigeons are sometimes kept. Around the village are commonly bread-fruit trees, and nearly all have plantations of bananas, two or more classes of yams, island cotton, papaya, gourds, sugar-cane, maize, arrowroot, betel, &c. Often there is some open land for cultivation of hard grain, such as millet, but this food has given place to imported rice. All the rest of the land is under coco-nut palms for their 'milk', fibre, and oil, the yield of all of which is unusually heavy. The villages are on the lagoon beaches, and good paths are kept up over the islands.

Manufactures, &c.

Some islands are almost entirely concerned with their own coco-nut produce and that of uninhabited islands in their vicinity. Others are mainly fishing islands, while still others are engaged in manufactures. These last are scattered all over the archipelago, but the workers in each form castes, and two trades seldom occur in one island. The chief trades are boat-building, rope-making, cloth-making, embroidery, carpentering, lacquer work, jewellery, basket-making, stone-carving, sail-making and mat-making. The jewellery is made from Indian rupees, and the lac is imported as well as metal for the tools. In all else island produce is used. Of coir-rope there is a large export, the fibre being very long; rope from *Hibiscus*-bark is also made for the native vessels; special rush-mats from the southern atolls form the usual present to foreigners, but ordinary mats and sails are made from the leaves of the screw-pines. Suvadiva and Addu are to a considerable degree self-contained, but there is local trade between the other atolls. The only manufactured necessities not locally produced are metal and earthenware vessels.

The trading vessels of the group are peculiar square-sailed craft, with larger decked vessels for longer voyages,

showing a mixed design of all nationalities. The rupee is current, but formerly there were silver fish-hook coins; bronze coins, 25 and 100 to the rupee, are used for smaller transactions.

Inhabitants, social conditions, &c.

The relationship of the Maldivan race is probably indeterminable.[1] Caucasians were introduced for marital purposes from Arabia, and the Malays brought Burmese girls. Negro slaves came from Zanzibar and Arabia in numbers. There has always been some intermixture with the Malabar coast of India, intensified by a religious connexion with certain of the descendants of Muhammad there residing. There is a general belief in magic and charms, which are Arabic in origin. The language is a peculiar tongue related to ancient Singhalese. The writing is Arabic, but it is only in Addu that many can understand it. Schools for the learning of a number of sentences from the Koran are held in every island for both boys and girls. The marriage of a girl is generally arranged by the mother, and the husband first goes to the girl's house. Tops, hand-ball, kites, &c., amuse the children, while various Indian games, with boat-sailing, wrestling, quarter-staff, and singing serve for the adults. The semi-religious secret sects and societies of Muhammadan countries occur, but the foreigner is everywhere safe. Even among themselves serious crime is almost unknown out of Malé.

Navigation is by the quadrant, and the names of the points of the compass and the positions of the stars at different seasons are known to the captains of vessels. Small vessels from the northern atolls frequently cross to Cananore and Ceylon, while larger vessels, especially from the southern atolls, regularly trade to Calcutta and Chittagong, leaving in the south-west monsoon; voyages to Malay ports and also to Arabia have occurred in recent years. Coco-nuts dried in their shells and coir-

[1] Dr. W. L. H. Duckworth (see Bibliography) has shown that there is great variability in physical type, pointing to a diversity of racial stock. On the whole he considers the maritime natives of the Malabar coast are the nearest allies. The writer is inclined to ally the Maldivans to the coastal natives of south-eastern Arabia and the Sokotra.

rope form their usual cargo for exchange, while rice is the chief import; each member of the crew has a share. The bonito fishery is as important as the coco-nut industry; the fish is split up and smoke-dried for sale in India. The trade in this goes mainly through Malé, where all foreign vessels have to enter, and where alone foreigners are allowed to erect stores or to live. The government takes one-eighth to one-twelfth of the imports for duty. It is entirely in the hands of Colombo merchants of Persian descent, who exercise much political influence in Malé; however, what happens in Malé really matters little to the people in the rest of the archipelago. Anchorage is in the open lagoon of Malé, but there is a breakwater built along the edge of the reef opposite the town forming a boat harbour.

The Maldivans are mostly of some shade of chocolate with straight black hair. They form a hardy, vigorous race, excellent workers, good sailors, cheerful, loyal, and pleasant in every way, neither afraid nor servile, and most cleanly and intelligent.

The usual dress is a loin cloth and head turban, the women also wearing a chemise of native cloth, decorated with embroidery. It is difficult to estimate the population, but, provisionally, it may be put at 75,000 people in 200 inhabited islands. The northern and southern atolls are most densely inhabited, while round Malé with its 4,000 to 5,000 inhabitants is a large area, the islands in which belong to nobles and are worked by their servants. Cases of a curious type of leprosy, of elephantiasis and of syphilis are found occasionally; they are isolated in accordance with the law; statements as to prevalence of the first disease are untrue. Typhoid fever is common and bowel disorders and ophthalmia are frequent; malarial fever is rife. Infant mortality is very great, there being no possible substitute in cases of necessity for natural feeding; to this cause must be ascribed the lack of increase in the population, for no devastating epidemics are recorded, though there appear to have been local epidemics of measles, which are usually rather fatal

to native races. All accounts agree in supposing that there must have been a decrease in the past, but the remains which point to this are pre-Muhammadan. There has been certainly a progressive decrease in the land area, but the available land is not half populated.

The position of the Maldive islands must be regarded as satisfactory to Britain. In the present state of political conditions there is no naval object to be served in annexing the group, and in any case an effective occupation and fortification is impossible. There is no wealth to be obtained which would benefit Britain, and annexation would not benefit the group. Lastly, there is no slavery and no oppression of the people which would justify any extension to them of the doubtful benefits of civilization from Ceylon. They have existed almost unchanged since the dawn of their history and the best policy of the protecting country for the Maldivan people is to keep trade and other conditions as they are.

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§ 2. *The Laccadive Archipelago*

Extent and physical character.

The Laccadives form a series of seventeen low coral islets and banks lying off the west coast of India between 14° and 10° N.lat. The isolated atoll of Minikoi, lying 111 miles to the south, is attached politically, but it is geographically distinct, and does not belong to the group. Of the

islands seven are inhabited, all lying within an area of 100 miles square, north of 10° N. lat. and east of 72° E. long. Of the seventeen banks ten are atolls with more or less ring-shaped reefs; one (Kardamat) is almost completely covered by a surface reef with land, two are large banks with one or more surface reefs and traces of the ring condition, and the remainder are completely submerged banks. Elikalpeni, Androth, Kalpeni, and Suheli are outliers, all separated by over 1,100 fathoms from one another and the other banks, while the rest are probably included within a common 950-fathom line. Of the atolls, Kiltan, Chetlat, and Kavaratti are perfect,[1] of oval shape, lying almost north and south, with the land largely covering their eastern reefs. Kalpeni is similar with a lesser proportion of land. Agatti bank has two atolls, Agatti itself closely resembling Kavaratti, separated by a depth of 8 fathoms from a northern atoll, with three islets on its eastern reefs. Cherbaniani, Suheli, and Bitra have the enclosing reefs complete, with shallow lagoons and a few islet-cays. Byramgore and Peremul are less regular, the circumscribing reefs being imperfect. Kardamat is an atoll in a late or early stage; it measures 5 by 22¼ miles, with an island 4 miles long on the eastern side of its reef, a kind of boat channel, the incipient or former lagoon separating it from the western side of its reef. Two of the submerged banks have land, Androth and the two islets Ameni and Pitti; both banks have deeper water in the centre, 16 and 26 fathoms, with 7 to 10 fathoms on their rims. The rest of the banks are not of atoll-shape; the largest is Munyal, 71 miles long by 14 miles broad.

The above are all coral banks and islands. Those of atoll-shape are all relatively small, with most of their land on their eastern sides. Their lagoons have depths

[1] The term 'perfect', used in connexion with an atoll, implies that the atoll consists of a surface reef completely enclosing a lake or lagoon of water, except perhaps for one or more narrow passages or channels through which the tide ebbs and flows. The enclosing reef is thus a ring that may be bent into any shape but not broken.

not usually exceeding 10 fathoms, and have no passages into them suitable for even the smallest trading steamers; anchorage can always be found in the north-east monsoon.

Population. Kalpeni, Androth, Kavaratti, Agatti, Kardamat, Kiltan, and Chetlat are inhabited. The first four are administered by the collector of Calicut (Madras) on behalf of the Bibi of Cananore, while the rest are attached to Kanara (Bombay), all being governed locally by native headmen. About 9,000 people inhabit them. In race they are supposed to be related to the Nairs; they speak Malayalam. They are all Muhammadans and belong to that mixed assemblage the Mopillahs; traces of their origin are found in many matriarchal customs. The history of the islands is little known, but they have always been attached to some Indian kingdom. All are densely planted with coco-trees and export coco-nuts in some form, with coir and mats manufactured from their husks, in exchange for rice; Chetlat exports coral for chunam, and some islands a little dried fish and a few bags of cowries. Vegetables are grown for home use, and formerly a little hard grain was sown. Bad hurricanes are not frequent, but one in 1847 is known to have flooded most of the islands, and caused the deaths of thousands. Diseases are imported from India, but the islands are not unhealthy, though dependent on brackish wells. The people retain many of their primitive customs, and have a wealth of traditions relating to the formation of their islands, the peopling of them, &c., which require to be recorded before they are lost.

Minikoi. *Minikoi* is 71 miles from the nearest Maldivan reef, 30 miles nearer than to the nearest Laccadive reef. It measures 5 by 3 miles, with a large island to the south-east, a passage of 2 to 3 fathoms to the north and a lagoon of 6 fathoms, occupying about 6 square miles. It has at times been attached to the Maldivan sultanate, but at the end of the eighteenth century fell under the Mopillah pirates and was finally attached to Cananore. The people are Maldivans of mixed descent, and the language is Maldivan. The island is as healthy as such a crowded

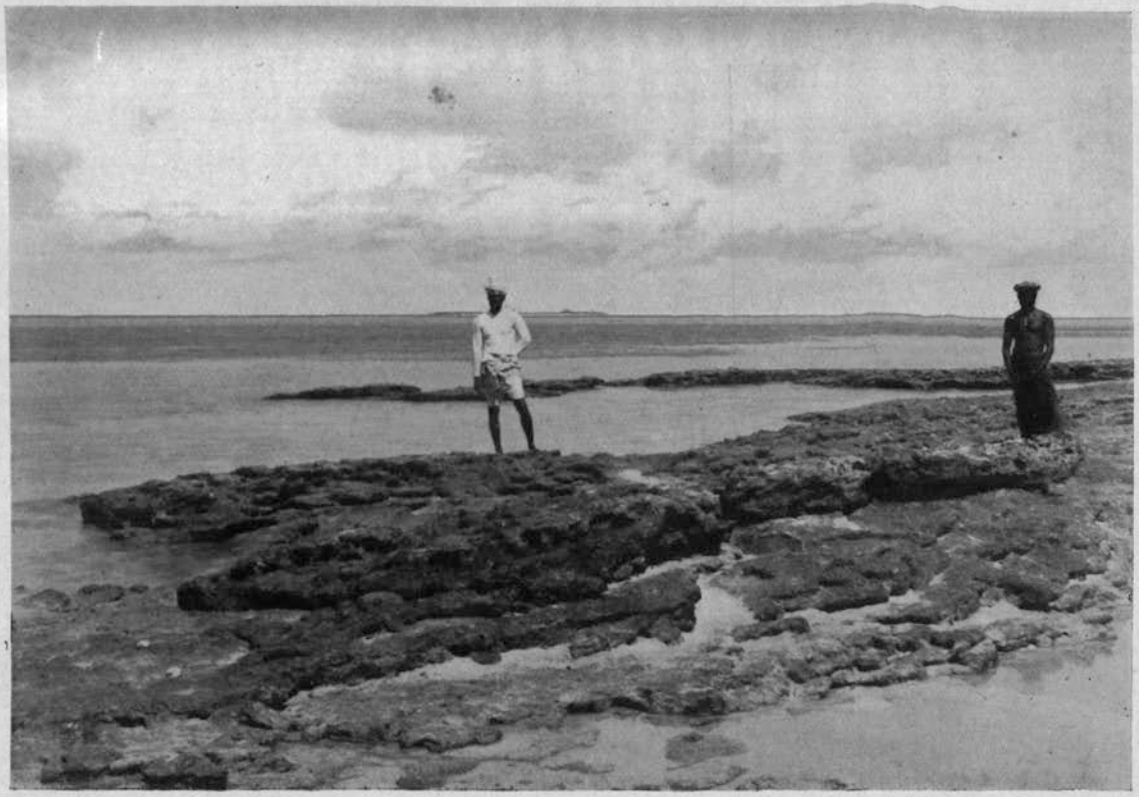

PLATE XIV. TURADU, S. MALOSMADULU, MALDIVE ISLANDS: BEACH SANDSTONE
(Phot. Professor J. Stanley Gardiner)

PLATE XV (*a*). SALT-PANS, ADEN

PLATE XV (*b*). DEVON FALLS, CEYLON (Page 338)

(Visual Instruction Committee)

space can be, though there is a tendency to leprosy; the patients, however, are isolated as required by Muhammadan customs. The produce is that derived from coco-nuts. The people are bold sailors and possess several large vessels which, in the north-east monsoon, are generally absent trading to Calcutta or Chittagong, and thence make one voyage to the Nicobars before returning home. At any time one-third or more of the male population may be away on these voyages or on steamers. Were it not for the profits from these, the people would starve, as the south half of the island is a government reserve, very ill cultivated; it is growing to some degree at the expense of the waters, while the north part, the people's half of the island, is being rapidly removed by abrasion. The island is on the track to Ceylon, and is marked by a Trinity House lighthouse, relieved periodically from Ceylon.

CHAPTER X

SOUTHERN ARABIA AND ADEN

By Professor J. Stanley Gardiner

Southern Arabian Protectorate.

The peninsula of Arabia is a plateau with its southern and western parts raised up to 9,000 feet above the sea. Its seaward side to the south and west is cut into the resemblance of a mountain range by rain, wind, and sun. Between it and the sea is a sandy plain of varying breadth with the high mountains visible behind; on the southern shore this is broken by the mountainous capes of Aden, Ras Fastak, and Ras Saukira. The rocks are granites, limestones, intrusive volcanic rocks, and sandstones; much of the surface is covered with blown-sand, a product of disintegration. Behind Aden are found the highest points of the plateau, and here the intrusive volcanic rocks are most marked, forming many small mountain chains. This country, the Turkish Yemen, is the area of greatest precipitation, and hence most cut up into valleys or wadys.

Many of these are broad and fertile, especially where the exposed rock is limestone. The coastal plain is crossed by torrents when rain falls, while the inland wadys of the south-west corner mostly drain into the Wady Hadramaut, which opens into the sea at Sihut, 6° E. of Aden.

Extent; physical character; climate.

The southern coast of Arabia extends from the Straits of Bab-el-Mandeb, where Perim lies (12° 39′ N. lat., 42° 25′ E. long.), to Ras-al-Had (22° 32′ N. lat., 59° 48′ E. long.), round which, in the Gulf of Oman, lies the important town of Maskat. Its trend is east-north-east to north-north-east, thus running at right angles to the Red Sea. The country between Perim and Maskat is a British sphere of influence, delimited at its western end from Turkey, the nominal suzerain of Yemen, but for the greater part marked off inland by the desert of Southern Arabia. It is a sparsely inhabited country except for the Hadramaut valley, divided between numerous small tribes, with some of which Britain has treaties. Aden is the only harbour along the whole coast, vessels elsewhere having to lie in open roadsteads. Coral reefs are not found between the Straits and Mirbat, owing principally to the muddiness of the water, and the continental shelf is generally narrow. Farther east the slope is less steep; Mosera is of coral, and there are large coral reefs in the bay to the south. It is subject to the monsoons of the Indian Ocean, north-east (here more easterly) from October to March, south-west from April to September, with two months of variable weather at each change and occasional cyclones of great violence. Probably the rainfall along the whole coast is nowhere more than 6 inches per annum, at Aden and Perim averaging rather less than half this amount.

Trade; products; natives.

The chief native ports of Southern Arabia are Makalla[1] and Sihut in the western half and Maskat to the extreme east. The trade is principally with Bombay and Aden, by occasional steamers and by native-owned bagalas and dhows, which sail also to the East African coasts and Sokotra, as well as into the Red Sea and Persian Gulf.

[1] Coal is known to exist in the vicinity of this port.

The products are gums, hides, dried fish, senna, honey, and frankincense, which are exchanged for dates, rice, cotton cloths, and metal goods. Date groves exist, and here and there a little grain can be grown, but the people are mainly herdsmen or fishermen. The ruling and trading classes are true Arabs of Semitic race, similar in type to those of the western provinces of Arabia, and probably came originally from those regions, but the bulk of the people are of a more ancient race, especially the Mahra and other tribes of the eastern half, which speak a Sabaean tongue. There is in parts much admixture of negro (slave) blood. All are nominally Muhammadans, but the more ancient races hold beliefs which are the relics of their pagan (or possibly Christian) days. The intractability of the people and the physical conditions of the country cause the south half of Arabia to be the least known part of the world.[1]

Kuria Muria Islands.

Besides Aden and Perim the only fully British possessions are the Kuria Muria Islands in 55° 50′ E. long., which were ceded by the Imaum of Maskat in 1854. They consist of five uninhabited rocky islets, rising into conical peaks, granite with limestone at lower levels, about 20 miles off the coast.

Aden.

The territory of Aden consists of two small peninsulas, Aden to the east and Jebel Ihsan, or Little Aden, to the west, together with a narrow strip of territory behind, centring round the large villages of Shaikh Othman. The total area is 75 square miles, of which Aden covers 21 sq. miles. The two isthmuses, joining Aden and Jebel Ihsan to the mainland, lie respectively to the east and west of the two peninsulas, which project towards one another, leaving a channel between. They thus form a bay, 9 miles across by 3 to 4 deep, with an entrance about 3 miles broad. To the west this bay is shallow and much blocked by sand, while it is deeper to the east, forming the inner harbour of Aden; the centre of the bay, between the

[1] There are scattered villages of *savages* along the barren coast between Jeb Musirah and Ras-el-Had. The country behind is supposed to be desert, but gun-running is common on this coast, and natives state that there is a narrow fertile broken belt on the inland foothills along the whole of South Arabia.

two peninsulas, forms the outer harbour, which is sufficiently deep for the largest ships. The maximum rise and fall of the tide is 7 feet, and currents are inconsiderable; the tides are peculiar in that there may be none or up to four in the day. Cyclones are rare. The innermost part of the harbour is available for native vessels, while between the two harbours an area has been dredged where the largest steamers can lie in safety. This area can be indefinitely extended or deepened at relatively small cost, and hence Aden as a port of call is likely to maintain its position in the future.

Surface features.

The two peninsulas are mountainous, while the country behind is part of the low coastal plain. Jebel Ihsan is a mountainous mass largely of granite, 6 miles long by 3 miles wide, rising to a sugar-loaf peak of 1,218 feet. It has numerous rocky points, and off its southern and eastern sides nine rocky islets have been cut by wave abrasion. A point from the mainland separates its inner bay from the main harbour. Aden peninsula is in shape a rough reflection of Jebel Ihsan. It is 5 miles long by 3 miles broad and is joined to the mainland by a low isthmus, 4 miles long by a minimum breadth of about 1,400 yards; thus it is of analogous shape to Gibraltar. Its highest point is Jebel Shamshan, 1,725 feet, a mountain of limestone. Volcanic formations occur south of the isthmus, and the floor of an extinct crater, about 1,000 yards broad, forms a flat area where the town of Aden is situated. To the east the rim of this crater has been broken by the sea, leaving in front a small island, Bab-el-Jehannum or Sirah,[1] formerly fortified. Tunnels through the rim connect the town with the isthmus. A pass leads out to a road running along the flat shore of the inner harbour to Steamer Point, the port and trading settlement, continuing thence round the strongly fortified points, Ras Marbut and Ras Tarshein, to a small open bay where the Eastern Telegraph Company's cables are landed.

Products: inhabitants.

The peninsulas and the mainland territory are barren in the extreme, though over 200 plants have been recorded.

[1] Probably a corruption from *Jazirah*, meaning an island.

Animal life is scarce on land, but the sea abounds in fish, and the dugong is occasionally seen. Shaikh Othman has a permanent water-supply, and a few vegetables are grown there. The average temperature is 82° F. in the shade, the range being from 73° to 95°. The place is not unhealthy, but its sunbaked wastes produce a peculiarly depressing effect on Europeans. The original inhabitants were Arabs of the Abdali tribe, but the present labouring classes are half Arabs, from every part of the Arabian coasts, and half Somali. The largest traders are Parsis, and there are many Indians and some Jews. A system of reservoirs above the town of Aden is supposed to date from the sixth century at latest; they are represented now by a series of tanks, cut in the solid rock, with artificial dams in the centre of the wady, one above the other in the main gully of Jebel Shamshan, and hold about 8,000,000 gallons. In addition there are wells and an aqueduct from Shaikh Othman, but good water is only obtained by distillation. Water-supply.

The origin of Aden is lost in obscurity, but it would appear to have been an important post well known to the Phoenicians. It passed successively into the domains of Abyssinia, Persia, Yemen, Portugal, Turkey, and back to native rulers. In 1839 Aden peninsula was captured by British ships, being subsequently enlarged by the purchases, from the Sultan of the Abdali tribe (Lahej), first of Jebel Ihsan and subsequently of a coastal strip. At the time of its capture it had greatly decayed, Mokha having superseded it as the chief coffee port of Yemen. Later, it secured part of the trade of Mokha, the decay of which was hastened by the Turkish development of Hodeida, but of course its main rise was due to its position in respect to the Suez Canal trade route. Still later the more effective occupation of Yemen by the Turks as well as the consequently disturbed condition of the country caused a loss of local trade, and led to the delimitation of the spheres of Turkey and Britain in 1903–4. The south-west corner in the province of Yemen is the most fertile part of Arabia, and Aden should naturally in the future History.

secure half its trade, which under more settled conditions should be of considerable importance. At present it is restricted by duties levied by the Sultan of Lahej and others on goods passing through their territories, but a railroad should ultimately develop a local trade equal to that of Jibuti.

Government: trade.

Politically Aden is attached to Bombay and subject to the Indian legal codes; its currency is Indian. It is garrisoned by the army in India (British and Indian troops), the general in command being the resident or governor as well; one or more warships are stationed there. It is a free port, and owing to this and its central position is an important coaling port. Its sole natural product is pumice, and its trade is mainly a transit trade to and from the small ports of Arabia and Africa. It possesses facilities for ordinary repairs to shipping and for watering and provisioning ships.

Perim Island.

Perim Island is situated in the straits of Bab-el-Mandeb, which is about 15 miles wide. It lies two miles off the south-west point of Arabia, Ras-el-Mandeb, separated by the Small Strait (as it is termed), having a depth of 7–9 fathoms, while the Large Strait on its opposite side has a depth of 150 fathoms. The latter has a permanent surface current setting into the Red Sea and a deep current setting outwards, 100 fathoms being approximately the dividing line; they are due to alterations in the specific gravity of the water caused by increased salinity produced by evaporation and to alterations of temperature.

Perim Island is $3\frac{1}{2}$ miles long and $1\frac{1}{2}$ miles broad and 214 feet high. It is composed of red lava, and is probably the remains of an ancient crater, the rim of which has been broken through by the sea to the south, forming an enclosed bay, Perim Harbour, with depths of 4 to 6 fathoms over most of its surface. Reefs, awash at low tide, fringe parts of the island, and coral conglomerate is found in places near the sea. The land is grooved by watercourses, but there are no permanent springs and consequently little vegetation.

Perim was garrisoned by the British from 1799 to 1801, when the French were occupying Egypt, and permanently annexed in 1857 in connexion with the construction of the Suez Canal. It has a small garrison of Indian troops from Aden (native troops), a lighthouse, a Lloyd's Signal Station, an Eastern Telegraph Station, coal lighters, water-condensing and ice works, &c. It has no local trade, but it is to some degree a port of call; its population is about 1,400.

Sokotra.

The island of Sokotra lies about 130 miles east of Cape Guardafui and 500 miles from Aden. It extends east and west, 70 miles long by 18 miles broad, with an area of about 1,300 square miles. To the south-west lie Samha and Darsa, rocky uninhabited barren islets of 2,440 and 1,500 feet in height, while half-way to the African coast is the island of Abd-al-Kuri, 20 miles long, 1,670 feet high. Sokotra consists of a series of plateaux of coarsely crystalline limestone, deeply channelled by water-courses and much weathered. The limestone extends up to 2,000 feet in height, and forms a line of cliffs, with a low drift-sand formation to the south and a series of rocky points extending out to the north and west with sandy bays between. Towards the east lie the Hagier mountains, granite formations, reaching an elevation of 4,656 feet. Overlying the granite are found recent volcanic rocks of the Aden series. These formations clearly indicate that the island was once joined to Africa, and that it was then nearly submerged and subsequently largely reformed by the movements which gave rise to the Gulf of Aden. The islands are now separated by depths varying from 250 to 500 fathoms, and around each are extensive shallows, probably largely formed by the action of the sea on the land. Corals grow freely but do not form surface reefs.

Sokotra has no harbours, but anchorage may be found in any of the bays. The south-west part of the island is arid and barren, but much is comparatively fertile, being well watered by the monsoon rains of July and December. The water-courses are then torrents, the streams being generally absorbed into the plains before reaching the

sea. The valleys are covered with rich vegetation, while the hills are studded with clumps of aloes, Dracaena (dragon's-blood tree), myrrh, frankincense, &c.

Inhabitants; products; trade, &c.

Sokotra was formerly known to the Egyptians as one of the incense islands. In the sixteenth century the Portuguese partially occupied it. In 1886 it was placed under British protection, largely owing to the piratical tendencies of its inhabitants. The Sultan of Gishin, in Arabia, is its nominal suzerain, and a relation of his rules as Sultan. Tamrida, Kadhup, and Kallansiya are the principal coastal villages, all lying to the north. They consist of plastered stone houses and are occupied by people of Arab blood. Inland are scattered inhabitants, many of them cave-dwellers, the Sokotri, an ancient race, speaking a language allied to the Mahra of Arabia, both daughter-tongues of Sabaean. Probably the population to-day numbers over 25,000, but this is merely a relic of a once greater people. All are Muhammadans, but Nestorian Christianity is supposed to have persisted until a comparatively recent period. The plains are unhealthy owing to fever; the hill climate, however, is excellent, though spring-water is rarely found. Dates form the only crop regularly cultivated, but the coast inhabitants grow some vegetables and millet; the coco-nut is not found. Large flocks of cattle, sheep, and goats are kept, the people living principally on dates and milk. Ghi, a kind of clarified butter, is the sole important export. Camels serve as beasts of burden, the wild (possibly feral) asses not being tamed. Over 600 species of plants have been recorded, but the fauna is as yet little known, though many peculiar species have been described. The biological affinities are both with the Ethiopian and the Mediterranean regions, though the island has clearly been isolated for a long period, a conclusion amply supported by its deeply intersected and weathered plateaux. The trade is by Arab vessels which call in passing between the various Arabian ports and Zanzibar; besides ghi, some cattle, aloes, dragon's-blood, and incense are exchanged for rice, coco-nuts, and coffee.

Of the smaller islands Samha and Darsa are largely formed of limestone; Abd-al-Kuri is granite, capped by limestone, apparently cretaceous. A pleistocene reef limestone is also found in places along the shore of the latter island up to 40 feet above the sea. All the islets are barren, with little bush and no cultivation, visited temporarily by pearl-shell fishers, who also obtain a certain amount of turtle shell. There are a few houses in Bander Saleh bay to the south of Abd-al-Kuri. Darsa, Samha, and Farum, the latter two rocks about 280 feet high, 13 miles north of Abd-al-Kuri, are the resort of sea-birds (for their annual breeding fairs), and are probably covered with guano.

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(The author has supplemented information obtained from the above by his own observations and material.)

Persian Gulf: Bahrein Islands.

[British interests in political and commercial questions connected with the Persian Gulf are of peculiar importance. These interests have been fostered by the Imperial and the Indian Governments; measures have been taken to preserve the peace among lawless peoples inhabiting the shores of the Gulf, and there is a British political resident for the Persian Gulf at Bushire (Persia). No British territory borders the Gulf, but the Sultan of Oman is under treaty obligations to Britain, and a political agent of the Indian Government resides at his capital, Maskat. There are also political agents at Koweit, a port near the head of the Gulf, and in the Bahrein Islands. The sheikh of these islands is under British protection. They lie about 20 miles from a point midway upon the west shore of the Gulf: Bahrein, their largest member, Muharek, Sitra and some five other islands are inhabited, there being in all some 50 villages, occupying oases and set in palm groves which dot the otherwise inhospitable soil. Bahrein is low and sandy save for a rocky hill 400 feet high in its midst; the other islands are largely of coral formation. There is a fair water supply (in Muharek from submarine springs), but the climate is somewhat unhealthy. Particulars of trade, products, and population are furnished on pp. 472, 473.]

CHAPTER XI

CEYLON

By J. C. Willis

Early importance of position.

Ceylon lies at the apex of the Indian peninsula, and in the practical centre of the Indian Ocean. It thus possesses almost unrivalled geographical advantages, while at the same time it has an excellent climate for agriculture, even though the soil is not of the best. It has therefore through all ages been an object of desire both to the agricultural peoples of Asia and to the trading nations of the rest of the world. It was conquered 500 years before our era by the Sinhalese; it was later invaded, and partially conquered, by the Tamils of the Madras Presidency. The Arabs settled upon its coasts in the ninth century, the Portuguese acquired it by conquest in the sixteenth, the Dutch in the seventeenth, and the English in the end of the eighteenth.

Early settlement and trade.

The first accounts and descriptions of the island are vague, and early western writers, such as Ptolemy, who appears to have derived his information from Alexandrian traders, attribute to it much too great an area. It was already at this period a place of commercial importance, as the meeting-point of east and west, especially after Hipparchus, in the reign of Claudius, had observed the regularity of the monsoons, and launching boldly out from the African side of the Indian Ocean, had reached the coast of southern India. Until this time or later, the Chinese came right across the ocean, but subsequently the western navigators met the eastern at Galle, which became a great port of interchange. Many Chinese books of the first ten centuries contain descriptions of Ceylon. At a later period the Muhammadan power sprang up, and the route of trade in the west was altered from the Red Sea to the Persian Gulf. During this period the descrip-

tions of Ceylon are mainly by Persian and Arabian writers. Still later, the Portuguese entered the Indian Ocean, defeated the Muhammadans at every opportunity, and diverted the trade to the route round the Cape of Good Hope, which has only in modern times, with the opening of the Suez Canal, been once more abandoned in favour of the oldest route of all, that by Suez.

Physical features.

Ceylon is separated from India by the narrow Palk's Strait, which is crossed by Adam's Bridge, a row of islands and sandbanks, with very shallow water between, the only practicable channel being close to the Indian end, and having only about 10 feet of water available. Railways are practically completed to either side of this strait, and a ferry is to be established there, bringing Ceylon into more intimate relations with India than heretofore.

The island extends 270 miles north and south by 140 east and west, and has an area of 25,481 square miles, or five-sixths that of Ireland. Most of it is flat or gently undulating, but in the southern portion a mountain mass composed of ridges running generally to the south-east, and reaching a culminating height of 8,296 feet in Pidurutalagala, rises abruptly from the plains. The most conspicuous mountain is Adam's Peak (7,353 feet), but it is only the fourth in point of elevation. In this mountain region the chief rivers take their rise, e. g. the Mahaweliganga (206 miles, with its mouth at Trincomali), the Kelani-ganga (90 miles, at Colombo), the Kalu-ganga, and many more. The rivers, however, are of so rapid a flow, and in recent times especially have become so much silted up by the floods caused by the clearance of the forests for planting, that they are only navigable to a slight extent by small boats, and are not a factor of serious geographical importance as means of transport. Lakes, strictly so-called, do not occur, but lagoons, due to the damming up of river mouths by the prevailing winds and currents, are frequent round the coast, and were united by canals in the time of the Dutch, forming important means of transport.

Distribution of forests and agricultural land.

There can be little doubt that the whole island was once covered with thick forest, and owing to its configuration only the south-western portion had rain the whole year round, the remainder obtaining most of its rain in the last three months of the year. On the other hand, this 'dry' country has on the whole the better

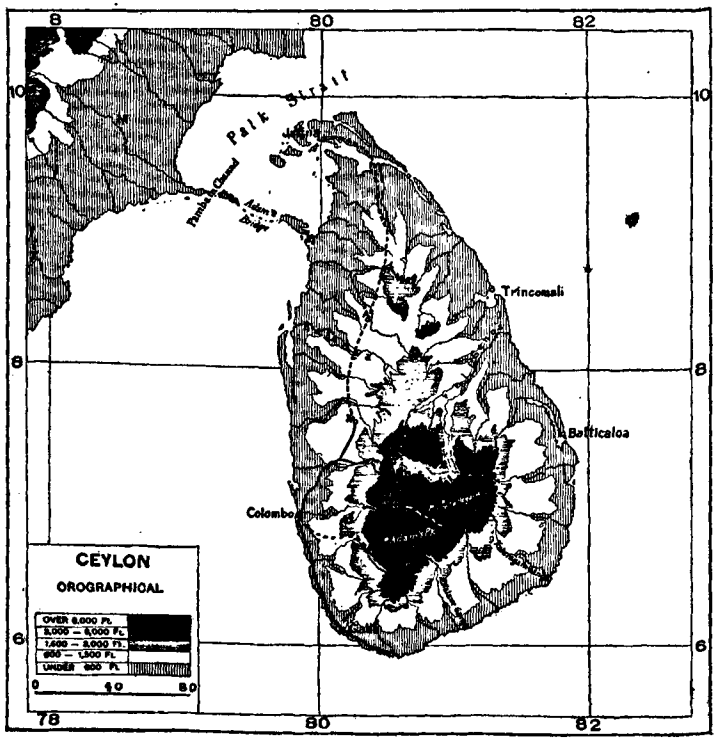

Fig. 14

soil, though agriculture upon it requires more care and trouble in the use of irrigation and cultivation. It thus happens that in both zones agriculture has been or is important. The Veddahs, the earliest known inhabitants of Ceylon, had no regular agricultural system, and their conquerors, the Sinhalese, settled in the north central plains, where they developed an important agricultural industry under irrigation. The Tamils drove them out of this, and did not preserve the tanks, as the irrigation

works are called; they were consequently not able to settle there themselves, but gradually built up a prosperous industry round Jaffna, in the far north, while the Sinhalese retreated to the southern wetter parts of Ceylon, where irrigation was less costly and troublesome, and there continued the cultivation of rice. About the end of the Dutch period, the agriculture of Ceylon was practically confined to three districts, Jaffna in the north, the south-west coast, and parts of the lower hill country, as about Kandy and Badulla.

With the conquest of the Kandyan kingdom, agriculture under European management began in the hills, and since that time the whole of the mountain zone has been opened up for coffee, tea, caçao, and other products, while with the increasing prosperity and population of the island, the area devoted to the native crops of rice, coco-nuts, &c., has extended. At the present time, therefore, the only large area not devoted to agriculture is formed by the dry plains of the north and east, but the experimental cultivations which were started there by the Government in 1903 give reason to hope that before long this part of the country will also be occupied by a large agricultural industry.

As is natural in an agricultural country, the towns are not large, the only exception being Colombo, which has taken the place of Galle as the chief port, and has a population of 211,274. There are 40,441 people in Jaffna, 29,451 in Kandy, 39,960 in Galle; and there are many small towns in the planting districts of the centre of the island, such as Badulla with 6,488 inhabitants.

Geology.

Perhaps the most probable theory of the early geological history of Ceylon is that the island was at one time at the outer end of a peninsula stretching north-eastwards from South Africa through Madagascar to the Deccan and Ceylon. By the action of the tides, by subsidence, and otherwise, this peninsula became broken up into islands, and finally disappeared, but traces of the connexion may be seen to this day in the African

affinities of some of the plants and animals of Ceylon and southern India.

A small area round the coast, especially in the north, is of raised coral or other recent formation, and there is a submerged shelf about 12 miles wide round the island, composed of detritus washed down by the rivers. Beyond this the sea rapidly deepens to 1,000 fathoms. In general, however, all the rocks are of igneous origin, gneisses resembling those of southern India, and like them belonging to the Charnockite series, consisting mainly of felspar, quartz, and pyroxene, with frequent occurrences of mica, hornblende, and iron ores. Bands of crystalline limestone are also found, and pegmatites or intruded granites, which are well marked in the southern province.

Decomposition of the gneisses and pegmatites results in the formation of kaolin or china clay, and also, much more commonly, in the production of laterite (locally known as kabūk), a rock which occupies large areas in the plains, and of which the famous 'red roads' of Colombo are made.

Minerals. Of minerals other than gems, Ceylon possesses few. Plumbago is by far the most important, about 30,000–35,000 tons being annually exported; it occurs in irregular seams chiefly in the west and south of the island. Mica is common, and is regularly mined. Of three kinds of mica, that known as muscovite is rare and of no value in Ceylon; biotite occurs in small crystals in the Charnockite rocks; phlogopite, the most important, is found at the junction of the granulate and crystalline limestone. Thorianite, a mineral containing about 75 per cent. of thoria, is found in small quantity. Of other minerals not at present mined, may be mentioned iron ore of excellent quality, gold, tin-stone, asbestos, and apatite.

Gems. The island has been famous for gems from very early times. They are mostly found in the alluvial plains lying to the south-west of the Adam's Peak range. Here they occur in a lower layer of gravel, into which pits are sunk. The gems of Ceylon belong to two classes:

I. *Oxides*

1. Corundum. This forms several valuable stones, e.g. the ruby, the blue sapphire (a stone in which Ceylon surpasses the rest of the world), the white and pink sapphires, the yellow sapphire or oriental topaz, and occasionally the green sapphire or oriental emerald. Both rubies and sapphires at times show a luminous star in the centre, forming varieties peculiar to Ceylon.
2. Spinel. This occurs in red, blue, violet, and green colours.
3. Quartz. A violet variety of this is the amethyst.

II. *Silicates*

4. Zircon. These occur of a fine leaf-green colour, and also yellow, orange, or red (hyacinth stone). Matara diamonds are colourless zircons obtained by burning poorly coloured stones.
5. Topaz. White or pale green in colour.
6. Beryl, or aquamarine.
7. Chrysoberyl, with its interesting varieties alexandrite and cat's eye.
8. Garnet. Common in Ceylon. When cut *en cabochon* it is known as carbuncle. A brown variety, the cinnamon stone, is frequent.
9. Felspar. Some of this is semi-transparent, and when cut forms the moonstone, which is either white, or with a bluish sheen.
10. Cordierite.
11. Andalusite.
12. Tourmaline. A stone showing different colours according as the light falls upon it.

Climate.

Ceylon, being close to the equator, has an equable climate, with but slight variations from one time of year to another. The range of temperature in one day is also slight at sea-level, though more pronounced at higher altitudes in the hills, an average daily range for Colombo, for instance, being about 12°, while in Kandy (1,600 feet) it may be 15°, in Nuwara Eliya (6,200 feet) about 18°. The mean temperature of the hottest month in Colombo is 82·6°, of the coldest 79·1°, the corresponding figures for Nuwara Eliya being 60·8° and 56·6° (Fahrenheit).

The seasons are determined by the monsoons, which

blow alternately from north-east and south-west, in each direction for about half the year. As a rule the earlier part of each monsoon is wet, the later comparatively dry, the end of the north-east monsoon (January to March) being distinguished in south-western Ceylon as the 'dry season'. The island may be clearly marked out into climatic zones by the effects of the monsoons. The south-west monsoon (April to September) brings rain to the hills (chiefly the western side) and the south-western plains, while the north-east (October to March) at first brings rain to all the island, later only to the eastern side of the hills. It thus follows that there are two zones in the plains: (1) the wet, on the south-west side, with rain at all times, and the driest period in the end of the north-east monsoon (January to March); and (2) the dry, to the north and east of the hills, with rain chiefly from October to December; and also two in the hills: (3) the west side with its dry season in the north-east monsoon; and (4) the east side with its dry season in the south-west monsoon (June to September). Temperature also distinguishes zones of climate, the mean temperature falling about 3–4° for every 1,000 feet of ascent. The plains, with a mean temperature of 80°, may be distinguished from the lower zone of the hills with means from 75–65°, and the upper zone with means from 65–55°.

Vegetation.

The great range of climate is accompanied by a corresponding range of vegetation, though the total flora is poor compared with that of the Malay islands. In no tropical country can floras of different type be so easily seen and studied, and there are good laboratories at Peradeniya and elsewhere for scientific investigation.

The forest, which formerly covered practically the whole island, was of different character in the different zones. When the dry zone was cleared for agriculture in early times there must have been large areas of forest left, for after its abandonment the country went back to forest. The clearing of the wet zone has taken place in comparatively recent times, more especially in the last half-century.

The richest flora occurs in the wet low country of the south-west, though only small portions remain in their primaeval natural state. Where the forest still exists the vegetation is rich; there are many tall trees, matted together with climbers large and small, and with a rich undergrowth. Among them the family of the Dipterocarpaceae takes a prominent position, being represented by many species of Doona, Stemonoporus, Shorea, &c., trees with tall straight trunks, yielding useful timbers, resins, &c. Other well-represented families among the trees and shrubs are the Anonaceae, Bixaceae, Guttiferae, Celastraceae, Ampelidaceae, Sapindaceae, Anacardiaceae, Leguminosae, Myrtaceae, Myrsinaceae, Sapotaceae, Ebenaceae, Lauraceae, Euphorbiaceae, Urticaceae, Palmae, and Bamboos. The forests contain many trees and smaller plants of economic value, but these were mostly exploited before proper conservancy was undertaken, and it will be long before the forests rise to their proper value as a national asset in this respect. The wet lowlands.

The general character of the vegetation of the wet low country is repeated in the hills, especially on the wetter western side, but as one ascends the relative proportions of various groups become altered, the palms and large bamboos for example nearly all disappearing before 3,000 feet, while the Rosaceae, Droseraceae, Geraniaceae, Ranunculaceae, Umbelliferae, and other families especially characteristic of temperate zones become prominent above 5,000 feet, where in the high mountain tops the flora assumes a somewhat sub-alpine character, though none of the mountains of Ceylon is high enough to reach above the limit of trees. Species of Impatiens, Eugenia, Strobilanthes, Semecarpus, Sonerila, and others, and many orchids, are characteristic of the mountain forests. The hills.

Up to the western summit level the forest was once practically continuous, but on the summit plateaus above 5,500 feet it is broken by grassy openings termed in Sinhalese pătănăs, upon which there grows a distinct flora, in which grasses or sedges take much more part, while there is often quite a show of small flowering herbs.

The solitary tree on these pătănăs is *Rhododendron arboreum*. Proceeding to the eastwards beyond the summit there is in general a descent to a second plateau of about 3,000 to 4,000 feet in elevation, especially in the southern part of the mountains. On this plateau it is of course necessarily drier, and the area of pătănă increases greatly, to diminish again as the high eastern summits are approached, once more increasing beyond these down to the dry eastern plains, where there is a large area of 'park country' covered with tall grass and scattered trees.

The dry country.

Most of the dry country to the east and north of the mountains is covered with forest, sometimes of great height, containing many valuable timber trees, such as ebony, satinwood, and Trincomali wood. Only comparatively small areas of this forest, however, remain in good condition, owing to the destruction caused by the native practice of *chena* (considered in the section on Agriculture, below), and most of this nearly uninhabited country is covered with the untidy and valueless scrub growing on old chenas.

The dry country has a flora of widely different composition from that of the wet country so far considered, and very closely similar to that of Madras and south-eastern India. It contains very few endemics—or species confined to Ceylon—whereas in the wet country there are about 800 such species, a proportion out of the total flora of 3,076 species, which is equal to that in many truly 'oceanic' islands.

Local floras.

Lastly, there is a number of specialized local floras to be found in Ceylon, in addition to those of the wet and dry forests, hill forests, pătănăs, park country, &c. In the far north-west and south-east, the driest portions of the island, are to be found the floras of sand dunes and sandy beaches; mangroves are to be seen to great advantage in many of the lagoons and estuaries of the coast, especially at Negombo; the remarkable family of the Podostemaceae is well represented in the rapids of the mountain streams; the rice-fields have a special

flora of weeds; and so on. Altogether, the island can show a wonderful variety of floras and types of vegetation, mostly easily reached by aid of the railways, and therefore to be recommended to students of the different types of the tropical flora.

Fauna. Ceylon belongs in a zoogeographical sense to India, and in common with southern India it has a number of animals whose nearest relatives are African. There are slight indications of faunal relations with the Malayan, Mascarene, and Australian regions. The variations from the typical Indian fauna may be explained by the separation of the island from the mainland, which probably occurred in the Tertiary period. The centre and south-west of Ceylon, excepting the mountain tops and the scattered patches of forest, are too much cultivated and civilized to have many wild animals, but they are plentiful in the plains of the north and east, especially in the game reserves, of which the best known is that near Hambantota, occupying an area of 150 square miles.

Mammals. Of mammals the most interesting is the elephant, which is still common, and is carefully preserved. Every few years an elephant kraal (corral) is held, the animals being slowly driven by beaters into a central stockade, where they are captured. The Ceylon elephant is smaller than the African, and rarely possesses tusks. Among other interesting mammals are the small black bear (*Melursus ursinus*), which is common in rocky places in the dry zone; the leopard, miscalled in Ceylon the cheetah (*Felis pardus*), common in many parts of the island, especially in the mountain forests; the monkey, of which there are five kinds; and the deer, of which there are also five kinds, including the axis deer (*Cervus axis*), which runs in large herds in the dry zone, the sambur (*Rusa aristotelis*, locally miscalled the elk), which affords good sport at high elevations, where it is hunted on foot with dogs, and the mouse deer (*Tragulus meminna*), a tiny creature about 18 inches high, which often does damage in gardens. The wild buffalo (*Bubalus buffelus*), an animal that affords very good sport, occurs

only in outlying districts, but the tame buffalo is used in every rice-field, and sometimes for road transport. The native bull is a small animal, but 'coast' or Indian bulls, which are much larger, are imported for draught purposes. Both are of the yak type, with a large hump, in front of which the drawing-beam is placed.

The wild boar is common, but Ceylon contains no 'pig-sticking' country. The jackal (*Canis aureus*) is abundant, and the mongoose, otter, and porcupine are frequent. Squirrels are almost the commonest animals in the island, and the pariah-dog, a wolf-like hound, is to be seen, usually in a half-starved condition, in every village. Bats are common, and a gigantic bat, to which the name of flying-fox is given, is often to be seen, flying in great flocks at dusk. The tiger does not occur.

Birds. Birds are fairly numerous, but there are few of gorgeous colouring, and they have been reduced by the clearances made for agriculture. Among the more interesting are the barbet (*Megalaena*), the magpie robin (*Copsychus saularis*), the jungle-fowl (*Gallus lafayetti*), many pigeons of beautiful colouring, the nightjar, the parrot, the peacock (*Pavo cristatus*), the golden oriole (*Oriolus melanocephalus*), the flamingo, the lark, and many others. The commonest bird about towns is the ordinary sparrow.

Reptiles and fish. Of reptiles, the most striking is the crocodile, of which there are two species (*Crocodilus porosus* and *palustris*); it is common in the irrigation tanks and in some of the rivers. Two enormous lizards, the Kabaragoya (*Varanus salvator*), and the Talagoya (*V. bengalensis*) are frequent. Snakes are common, but rarely seen; the most deadly are the cobra (*Naia tripudians*) and the tic-polonga (*Vipera Russelli*), while the commonest is the harmless rat-snake (*Zamenis mucosa*). Frogs, toads, and small lizards abound. Fish are abundant round the coast, and there are some good edible fish in the inland tanks and rivers.

Insects, &c. Insects are well represented. There are many large and beautiful butterflies and moths. Leaf and stick

insects, which mimic the appearance of green leaves or twigs, are common, though not easily seen. Ants abound, and so also do termites or white ants, the whole island, up to about 4,500 feet, being riddled with their burrows. Large spiders are common, and some of them make enormous webs. Fireflies, crickets, cicadas, and cockroaches abound almost everywhere.

Molluscs are frequent, the most noticeable being perhaps the large snail which climbs upon the palm trees, and lays eggs of enormous size. One of the most interesting events in the island is a 'pearl fishery', when the pearl oyster, really a mussel, is captured in large numbers upon the shallow banks between Ceylon and India, in the Gulf of Mannar. For several years there will be no fishery, and then will come a season of favourable years, when the oysters are present in large numbers, and can be fished. They are brought up by native divers, who are able to stay below water for a minute or longer. They are sold by auction in lots of 100 or more. A certain proportion of them contain the pearls, whose formation is due to the irritation set up by the presence of a parasite.

Molluscs: pearl fishery.

In its agriculture, as in its flora, Ceylon shows a great variety for so small an area. There are important acreages under coco-nuts, rice and other cereals, tea, rubber, cacao citronella, tobacco, cardamoms, cinnamon, areca-nuts, Palmyra palms, miscellaneous fruits, &c., as well as small areas under yet other crops. To some extent this is due to the variety of climate and elevation (rubber, for example, in the wet low country, cacao in the wet lower montane zone, tobacco in the dry low country of the north), but also it is due to the work of the Botanic Gardens in introducing new crops, such as tea, cacao, rubber, camphor, and others. Ceylon contains few native plants of economic importance other than cinnamon and timbers, and almost all its crop plants, even rice and coco-nuts, have been introduced at one time or another. Cinnamon was the chief item in the export trade until about 100 years ago, being placed

Agriculture.

under a strict government monopoly which was only finally abandoned in 1840.

Early Sinhalese agriculture.

In early Sinhalese times, agriculture, chiefly the cultivation of rice, was conducted, so far as we know, entirely in the 'dry' northern and eastern plains. So long as dependence was placed upon the rains, there was only one crop reaped in the year, and there was a considerable element of precariousness in the harvest, for the rains were liable to fail. At an early period irrigation, by means of 'tanks' or artificial lakes in which the rainfall of the north-east monsoon was stored up, was undertaken, and formerly most of the dry zone was cultivated in this manner, and was the seat of a large population. With the Tamil invasions the irrigation works broke down, and the population was gradually driven southwards into the 'wet' zone, where rice was cultivated, up to about 2,500 feet in the mountains, above that limit being the virgin forest, which has only disappeared since Europeans took up agriculture in Ceylon.

Tamil agriculture.

The Tamils did not follow the Sinhalese into the wet zone, but took up agriculture in the dry, where there is to this day an extensive, and comparatively efficient, cultivation of rice, tobacco, and other things, without the aid of irrigation tanks. At the time of the Portuguese landing, therefore, there was a fair amount of rice and other cultivation near Jaffna in the far north, along the south-west coast, and in the central part of the island, especially near Kandy, and not above about 2,500 feet. The remainder of the island (the rest of the wet zone, and parts of the dry) was covered with virgin forest, or was going back to forest after previous cultivation (the rest of the dry zone).

The Chena system.

In all this forest and scrub land the practice of *chena* went on, and in a great part of it still goes on. Chena is the favourite mode of 'cultivation' in all countries where there is forest, and a thin population. It consists in felling the smaller trees, burning off the dead wood, and cultivating a crop for two or three years on the land thus exposed, which of course is rich in plant food,

partly by the long growth of forest upon it, partly by the effect of the burning, which reduces the number of certain organisms in the soil that are inimical to nitrification. After two or three years the land becomes so weedy that it is less trouble to *chena* a new portion, and the old is left to grow up in scrub, which may in time become forest once more, but only if the land be surrounded by forest. In the greater part of Ceylon, the old chenas simply present a sea of low scrub, which is once again chenaed after ten to fifty years, the time depending upon the dampness of the neighbourhood, and other factors.

Agriculture under European direction.

During the Portuguese and early Dutch times, real agriculture as distinguished from chena does not appear to have extended very much, the cinnamon, areca-nuts, &c., which were exported coming largely from wild or semi-wild trees, but in the latter part of the Dutch period the cultivation of cinnamon and coffee was taken up, and the planting of coco-nuts was vigorously pushed, while no doubt the cultivation of rice increased with the increasing population. The change to a modern 'planting' country, containing numerous 'estates' of different products under European (and native) management, and exporting large quantities of produce to other countries, dates from the opening of the first road into the hills, when an experimental estate was opened near Peradeniya (close to Kandy) by the then Governor, Sir Edward Barnes, in 1824. From this resulted in a few years a great rush into coffee planting by Europeans, which led to the destruction of a great part of the mountain forests. Coffee was the mainstay of export agriculture until about 1880, when it began to fail rapidly under the attacks of the coffee-leaf disease, and was replaced by cinchona, and later by tea, which in recent years has been largely supplemented by rubber, while at the same time that these crops were coming in, the cultivation of cacao, cardamoms and others was also extending, and throughout the century the planting of coco-nuts has never ceased, so that the area under this product is the largest of all.

Labour. The manual labour of most of the area devoted to export crops is performed by Tamil coolies imported from southern India (chiefly the districts about Madura and Trichinopoly), of whom there are some 500,000 in Ceylon. The Sinhalese work but little on the estates of European agriculturists, although they are every year doing so in larger numbers. They devote themselves mainly to their own rice-fields and coco-nut gardens, to transport work, carpentry, and other occupations.

Agricultural zones. The opening up of the country by roads and railways, which has followed the planting industry, has of course largely contributed to the expansion of agriculture, the two branches of development going together. Ceylon now contains three distinct and somewhat divaricate agricultures—the planting industry, with its export trade, the Sinhalese village cultivations in the wet zone, and the Tamil in the dry zone, separated from the other two by a large stretch of uncultivated country, in which in recent years the Government has been trying experiments, which give reason to hope that this country will again become the home of a large agricultural population. The problem before the Government is the union of these three into one homogeneous whole, and their extension to cover the whole country.

Chief crops: area and distribution. The principal crops may be summarized as follows :

Rice (672,000 acres) is grown in little fields, terraced to suit the slopes. The methods employed are primitive, and the return of crop is very poor, probably on the average not exceeding eight-fold.

Coco-nuts. Coco-nuts (975,000 acres) are cultivated in large estates in the western and southern country from Puttalam to Tangalla, and near Jaffna and Batticaloa, while every native garden, however small, contains a few of these palms, which are of almost universal applicability for food, drink (toddy and arrack), building, utensils, oil, and other necessities. There are large exports to other countries of copra (the dried kernel of the nut, from which the oil is expressed), coco-nut oil, desiccated coco-nut for confectionery, coco-nut fibre or coir, nuts, &c.

Tea (514,000 acres) is the most important export crop, and occupies by far the largest cultivated area in the mountains up to the limit of cultivation at 5,000 feet, as well as a considerable area in the south-western plains. By aid of machinery the plucked leaf is made into tea at much less cost than by hand labour, and in this way Ceylon and India have been able to undersell on the market the produce of China. The export of tea is over 180,000,000 lb. a year. Tea.

Rubber (134,000 acres) has come into prominence with remarkable rapidity during recent years, and has so far proved very profitable. It was first introduced at the Botanic Gardens, where the original trees, brought from the Amazon valley in 1876, are preserved. Rubber.

Cacao (39,000 acres) is mostly grown between Kandy and Matale, and about Badulla, thriving best at an elevation between 1,000 and 2,000 feet. Partly owing to the particular variety which has been much cultivated in Ceylon, but mainly to the care taken in the preparation, the prices of Ceylon cacao are usually the highest in the market. Cacao.

Cinnamon (40,000 acres) is grown on the sandy soil of the south-west coast, and prepared by peeling off the bark and rolling it up. The growth of this spice has been practically a monopoly of Ceylon for a very long period. Cinnamon.

Tobacco (25,000 acres) is chiefly cultivated in the neighbourhood of Jaffna, though also near Chilaw and in the drier country a little east of Kandy. The leaf is unfit for a European palate; it is coarse and rank, and finds a special market among the people of Travancore. Other crops.

Cardamoms (9,000 acres) are cultivated in the mountains at about 4,000 feet, in the shade of jungle trees, and the seeds, which form the spice, are exported for use in confectionery, &c.

Areca-nuts, Palmyra palms, and the other crops mentioned, are cultivated in a more casual manner, and need no special mention. The marked feature of native agriculture is this casual intermixture of crops, by which some of the advantages of rotation are obtained while

at the same time capital is not required in any large amount, any tree that dies being simply replaced by another, and the jungle of 'cultivated' plants perpetually presenting the same aspect.

Irrigation: tanks.

As rice is the national food crop, and grows satisfactorily only in a few inches of water, irrigation is a necessity, even in the wettest parts of the island. In the wet parts of Ceylon, however, irrigation is simple, consisting in the diversion of some of the little streams, and only in the dry zone do the irrigation works attain important dimensions; there they form the artificial lakes, known as 'tanks'. Tradition says that the first tank was constructed in 504 B. C., but as this was a fairly large one, it is probable that smaller ones had been previously built and found useful. The system adopted in constructing the tanks was to build earthen 'bunds' or dams across a valley, to hold back the water during the rainy season. As masonry was not employed, it follows that as a rule only those streams were dammed which ran dry in a part of the year. The bund was provided with a spill, and from near its ends canals were made to carry the water down to the fields below. Another bund was constructed some miles lower down the valley, forming a tank into which the waste water from the area irrigated by the first tank could flow, and so on. In this way it was ensured that no water reached the sea without having done all possible work in irrigation. While at first the tanks were comparatively independent of one another, before long several large tanks were constructed near the upper ends of some of the principal valleys, and the streams from these were of great size. Diverging from one another at the tank, and flowing at the gentlest possible slope, these streams crossed the heads of most of the tributary valleys of the main stream, and part of their water could be diverted to fill the tanks in these whenever the local rainfall was not sufficient to do so. In this way greater efficiency was given to the system of irrigation. One of these great 'keystone' tanks, Kalawewa, has been restored, together with about 50 miles

of one of its lateral canals, the Yodi-ela, running from the tank as far as Anuradhapura, which is situated in a different valley to that of the stream (Kalu-oya) dammed up to form the Kalawewa tank.

Decay of the tank system.

At one time most of the north of Ceylon, with the exception of the little Jaffna peninsula, in which there are no streams, was irrigated in this manner, and was the seat of a large rice-growing industry, but with the Tamil invasions the tank system went into disrepair and ruin, very probably by the withdrawal of the tank guardians from their work. The old tanks have very small spills, and it is probable that water was diverted across country in various ways to avoid danger. But if this were not properly attended to, the first heavy wet season would fill and burst the topmost tank, and the rush of water that would thus go down the valley would burst those below. At the time of the British occupation the whole of the tanks were found breached, and the country covered with forest, except in a few spots where the small and strictly local village tanks had been restored. The Government has restored many of the large tanks, but until a more enterprising and economical population can be induced to settle in the country, nothing seems likely to come of this work.

To furnish an idea of the size of some of these works, the dimensions of a few of the restored tanks may be given. Kalawewa occupies 4,425 acres, and has a depth at the spill of 22 feet. The modern spill is 600 feet long, while the ancient one was only 200 feet, and the depth of water (and consequently the size of the tank) much greater. Minneriya occupies 4,500 acres, Nuwarawewa 2,900, Nachchiyaduwa 3,920.

Irrigation in the wet zone.

In the wet zone, to which the Sinhalese were driven by the Tamil invasions, the irrigation is much smaller in scale, for in every valley there is a practically perennial stream, which has a small dam thrown across it to turn its waters into the rice-fields, and the waste of water, for which the Ceylon people are notorious, is of less moment than in the dry zone. In the mountain zone

the irrigation work is of a more imposing kind, for long *elas* or irrigation channels are often made, leading water for many miles around the sides of the mountains, from the larger streams at high levels to rice-fields at moderate elevations, and these fields themselves are marvels of terracing work, each field often consisting only of a few square yards of land, perhaps 18 inches above the next below.

Mining. The only serious mining in Ceylon is for plumbago or graphite, for mica, and for gems. The island is one of the chief sources of the first-named mineral, supplying about 36 per cent. of the world's consumption. The mining is entirely in native hands, and European attempts to improve on the rude methods employed have always resulted in failure, the reason probably being that the veins of graphite are so irregular and uncertain that it does not pay to expend capital upon elaborate methods of mining, or even upon such simple operations as keeping the mine dry by pumping. Between 200 and 300 mines are in actual operation, as well as numerous more or less irregular diggings. The crude graphite obtained is sorted in Colombo into grades, the chief of which are 'large lump', 'small lump', and 'dust'. Mica occurs in veins near to the crystalline limestone, and pits are sunk into this formation to obtain it. Good sheet mica is valuable, being used for insulation and other purposes. Gems are mined for in the alluvial plains to the south-west of the Adam's Peak range, where they occur in a lower layer of gravel at a varying depth below the surface of the ground. Pits are sunk into this, and the material obtained is washed out in water, when the lighter parts are carried away, and the gems are carefully searched for in the residue.

Communications. Ceylon is well provided with means of transport, both local and external. A very large number of steamships call at Colombo, which is now, as far as regards tonnage calling there, among the first ten ports of the world, and the rates for carriage of goods are reasonable. The island itself is well intersected by roads, while a small

length of railway is also open, connecting with Colombo the chief planting districts which furnish the export trade.

Early development.

In early times, and during the rule of the Portuguese, local communications were of the most limited kind, and any trade with the interior was carried on by aid of pack animals or coolies. During the Dutch period the great lagoons along the coast were united by canals, and a cheap means of transport was thus provided for these maritime districts, which is even yet largely availed of for traffic that does not demand speed, such as that in coco-nut products. With the conquest of Kandy by the English, a new era dawned for the island, for the policy of the Romans was followed, and a road made right through the conquered country, by way of Kandy, Nuwara Eliya, and Badulla. Almost at once, the interior being thus rendered accessible, the governor, Sir Edward Barnes, initiated experiments in cultivating tropical crops on a plantation near Peradeniya, and before long it was discovered that the cultivation of coffee, which had been introduced by the Dutch but had not been successful in the plains, was eminently suited to the hill country of Ceylon. With this began the rush into planting, which led to the clearance of a great part of the hills, and caused coffee to be the mainstay of export trade for about 45 years. As the industry grew, away from the central road, other roads were made for its benefit, while at the same time the island was so prosperous that it could afford to make roads to open up other parts also. As time progressed, local agriculture and the planting of export crops extended more and more, so that the roads whose construction was thus rendered necessary formed a network over the south-western and far northern cultivated parts of the island, while at the same time all important places throughout Ceylon were connected by means of roads.

Railways.

The same history repeated itself in regard to the railway, which at first was constructed simply from Colombo to Kandy, and opened in 1869, 45 years later than the

road over the same ground. Later it began to be extended through the coffee districts to Nuwara Eliya, and along the populous south-west coast towards Galle, and ultimately past both of these places. In recent years, it has been extended to the far north of the island, to Negombo, to the Kelani valley (now a great tea and rubber district) and to Ratnapura (a rising centre for rubber), and extensions are under construction to Chilaw, and to Mannar in the far north-west, where there will be a ferry to India.

Commerce.

In very early times there was a considerable transhipment of goods at Galle, but the island exported nothing until the Middle Ages, when a trade sprang up in cinnamon, gems, elephants, and other 'wild' produce. Later, as capitalist agriculture developed, Ceylon began to export various other articles, and by the middle of the nineteenth century, when the output of coffee reached its height, the trade represented a considerable value, while in more recent times, with the growth of many agricultural industries, it has become very important, and, in proportion to the size of the country, one of the largest in the Tropics.

Ports.

As all the trade practically passes through Colombo, which is also the great port of call of the Indian Ocean for coal and transhipment of passengers and goods, it is to be expected that there will be a great amount of tonnage calling there. Thirty-two lines of steamers made each ten or more calls at the port in the year 1910–11, the first place being taken by the British India Steamship Company. With the increasing size of ships, the port of Galle was found to be dangerous, and was superseded by Colombo, where a magnificent artificial harbour has been constructed. Galle has sunk to a port of call for a few coasting steamers, and the other ports of the island are hardly worth mention, with the exception of Trincomali, which has one of the finest harbours in the world, but unfortunately is out of the direct route of traffic. It was used as a naval station till recent years, but was afterwards practically abandoned.

Population.

The native-born inhabitants, or Ceylonese, are principally of Sinhalese race, but there is also a large number of Tamils, of Burghers or Dutch descendants (usually) and Eurasians (always) of mixed European and Asiatic descent, of Muhammadans or Moormen, Malays, Veddahs, and a few others, such as English born and bred in the island. In addition to this, there is a considerable foreign-born population, chiefly due to the agricultural enterprises of Europeans, consisting of about 7,600 Europeans, about 531,000 Tamil coolies from southern India, and a few others.

Veddahs.

Dealing with these races in order, we may begin with the Veddahs, the oldest known, and perhaps the first, inhabitants of Ceylon. They are a curious savage but harmless race, living, to the number of about 5,000, in the denser and more remote forests of north-eastern Uva, where they form a very small community, which is dying out, or intermarrying with the surrounding Sinhalese. The genuine pure-blooded Veddahs live on honey, jungle roots and other produce, and game slain with the bow and arrow; they obtain what they require further by a curious system of barter, leaving what they propose to give in exchange, with a note of what they want, at some definite spot, but not being themselves seen. Neolithic stone implements having been found in the caves which they inhabit, they must at any rate be among the very earliest inhabitants of Ceylon; and as the Sinhalese invaders were probably mostly men, there seems also a fair probability that the present Sinhalese race contains a large element of Veddah blood.

Malays.

The Malays (some 13,000) are the descendants of disbanded soldiers of former regiments of the Ceylon garrison who settled in Ceylon. They pursue various trades, such as working in rattan, and being more courageous men, and more amenable to discipline, than the Tamils or Sinhalese, they find considerable employment as police, watchmen, &c. Their religion is Muhammadan.

Muhammadans.

The Muhammadans proper (some 234,000), or Moormen as they are locally called, are the descendants of Arab

traders or conquerors of very early times, who settled along the western coasts of India and Ceylon, intermarried with Tamil women, and subsequently kept their race fairly pure. They usually speak Tamil as their mother tongue. They are of finer physique than most natives of Ceylon, and like other Muhammadans keep their women secluded. In the larger towns they form a great part of the traders and shopkeepers, but in the country, and especially about Batticaloa, they are also energetic agriculturists. In the interior Kandyan districts they generally speak Sinhalese, and assimilate more closely to that race.

Tamils. The Tamils born in the country (528,000), of native-born parents, are known in Ceylon as Jaffna Tamils, as distinguished from the Tamil coolies, and are the descendants of the early conquerors of the north of the island, who have ever since retained possession of the northern and eastern provinces, in which there are no Sinhalese people, except on the edges next to the Sinhalese provinces. They are of Hindu religion, and show great variety of caste, while physically they are well set up. In their own country they are the best agriculturists that Ceylon contains, whilst great numbers of them obtain employment elsewhere as clerks, accountants, station-masters, tea-makers, and in other capacities.

Sinhalese. Finally, the Sinhalese, who are the most numerous race in the island, may be divided into two sections, the 'low-country' men (1,717,000), inhabiting the plains of the west and south, most of whose men wear the comb in the hair, and have probably become a good deal mixed in blood with other races, and the 'Kandyans' (999,000), of the purer Sinhalese race, who inhabit the hills (or *kande*) of the Central, Uva, Sabaragamuwa, North-central, and part of the North-west provinces. The bulk of the low-country men are engaged in agriculture, but large numbers are fishermen, or engage in other trades. The Kandyans are a conservative and feudal agricultural race, and of recent years large numbers of low-country men have settled among them, and have obtained possession of a great deal of their trade.

Burghers.

The Burghers occupy a more influential position than their mere number (26,000) would indicate, filling most of the more important minor posts in the Government service, devoting themselves with success to the professions of law and medicine, and providing a great proportion of the clerks and other employés in business houses in Colombo. The term 'Burgher' dates from the time of the Dutch, and strictly denotes a descendant of a Dutch burgher, or member of one of the old guilds, but in ordinary practice it is applied to any one of mixed European and Asiatic descent, and includes those with Portuguese or English, as well as Dutch blood. The Portuguese descendants are largely mechanics.

Foreign-born population.

The great bulk of the foreign-born population consists of the 500,000 Tamil coolies working on European estates of tea, rubber, &c., making roads, acting as ricksha coolies, and generally doing the hard manual labour of the island other than that of the rice-fields. They mostly come from the Madura, Tinnevelly, and other far southern districts of the Madras Presidency, and are of low caste, dark colour, and poor physique. They look upon Ceylon as a kind of Eldorado, where they will be able to save a little money, and go back to India and buy land there when they retire. When properly supervised they are good workers, and without them European agriculture in Ceylon would at present be impossible.

A considerable number of Moormen (33,000) are foreign-born, though doing business in Ceylon, and another important element in the local population is the Chettis, a caste of money-lenders from Southern India, who hold a very strong position in the island, having a large number of its people in their power. The so-called Afghan money-lenders from Northern India are also numerous, and there are scattered representatives of other races.

Europeans.

The most important, though not the most numerous, of the foreign population, are the Europeans (7,592), mostly English, who represent the ruling race, carry on most of the important businesses, superintend most of the larger agricultural enterprises, occupy most of the

chief positions in the Government service, and generally are found in most of the local positions of responsibility. Few of them are of local birth and upbringing; most are recruited from Europe before the age of 25, and retire thither in their old age. The climate, though healthy enough for those who obey the rules of tropical hygiene, is trying. This is recognized in the fact that the age for retirement in Government employment is fixed at 55, and a climate bonus of 5 years is added to the actual service. Children can be kept in Ceylon longer than in most parts of India, but must be sent away before 10 years old, unless they be brought up in places over 5,000 feet in elevation.

Native life: customs and conditions.

The Sinhalese, Tamils, and Moormen, as numerically the predominant peoples of Ceylon, call for further consideration. The Sinhalese invaded Ceylon from the north, at an early date, traditionally supposed to have been 543 B.C.; they conquered the Veddahs and probably largely intermarried with them, introduced the cultivation of rice and apparently that of coco-nuts, and brought the island into a state of civilization. By the beginning of our era it was already populous—at least in the northern and eastern plains—and most of the great irrigation works whose ruins cover that part of Ceylon were by that time constructed and in full operation. But already raids from the opposite coast were beginning, and gradually the Tamils or Malabars obtained possession of the north and east of Ceylon; the Sinhalese capital, which was at first at Anuradhapura, moving gradually southwards, to Polonnaruwa in 769, to Dambadeniya in 1235, and, after many wanderings, reaching Cotta, near Colombo, where it fell into the hands of the Portuguese in 1517. The Kandyan or mountain kingdom was nominally feudatory to Cotta, but in 1582 became independent, remaining so until finally taken by the English in 1815. As they drove the Sinhalese out, the Tamils settled in northern and eastern Ceylon, which they occupy to this day.

The Sinhalese is usually of the Buddhist religion, while the Tamil is a Hindu, and the Moorman a Muhammadan,

and many of the differences in detail between them depend upon this fact. The Sinhalese is also an Aryan, with a language in which many of the roots resemble those in the European tongues, while the Tamil is a Dravidian, belonging to the pre-Aryan stock of India, and the Moorman has Arab and Tamil blood in him. In all but the Muhammadans, caste is still strongly marked, though not so much so as among the Hindus of India. Marriages rarely take place between members of different castes, but there is more intercourse between them than in India. The lowest in the scale are the outcast Rodiyas, who occupy villages in a few districts of Ceylon, and are looked down upon by all the other natives, even though they may themselves be of low caste. The esteem in which agriculture is held may be gauged from the fact that the cultivators are in both races near the top of the caste system.

Physique.

In physique the native of Ceylon is in general but poor, though commonly gracefully developed and of very erect carriage. The strongest men are in general some of the Moormen, and the natives of Cochin and other west coast ports of India. With the exception of the low-caste men and coolies, the native possesses good looks beyond the average, and some of the Kandyan chiefs are among the handsomest men in the world.

Clothing.

In regard to clothing, the amount employed depends to a very large extent upon the wealth, caste, and position of the individual. The ordinary poorer villager, or estate coolie, wears little but a loin-cloth; the next stages are shown by the lengthening of the cloth, then a vest in addition, then a jacket, then sandals, followed by shoes or boots and a hat, often the entirely unnecessary and uncomfortable topee or sun-hat. Trousers are sometimes worn under the cloth, and lastly this is discarded, and the man appears clothed in European style. All the additions to the cloth or petticoat, which is the natural dress of the native, are European, even the complicated dress of a Kandyan chief in full ceremonial attire. Even the comb worn in the hair, which is an almost certain distinguishing

mark of a low-country Sinhalese, was introduced in Portuguese times.

Names. The names borne by natives are often long and complex, especially those of well-born folk. Very many of the low-country people have a working Portuguese name, taken centuries ago, sometimes instead of, but often included in, the Sinhalese name. From the profusion of de Silvas, de Soyzas, Pereiras, and such names in the directory, it might appear that Ceylon was still a Portuguese colony, and yet many of the bearers of these names are pure-blooded Sinhalese.

Housing, food, &c. The houses occupied by the people vary from the 'lines' (*layan*) of the Tamil coolies, each of one small room occupied by a family, up to large and elaborate dwellings in European style. The typical Kandyan house is built round a courtyard, and two or three generations of a family live in it. Life in the low country of Ceylon is conducted very much in public, on the front of the house. Curry and rice form the national food; the curries, being made with fresh ingredients (chillies, coriander, turmeric, garlic, fenugreek and caraway seeds, ginger, onions, coco-nut, &c.), show great variety. The poorer coolies are often obliged to live mainly on plain rice and salt. The common drink is water, but there is a considerable consumption of arrack (the spirit distilled from coco-nut toddy), gin, and tea. Instead of smoking, the common custom is to chew betel—a portion of areca-nut wrapped in a leaf of betel pepper smeared with lime. It has a stimulating effect, but colours the saliva like blood. The native is much addicted to bathing and washing, except upon the unlucky days, Tuesday and Friday.

Occupations. The occupations pursued are many and various. To some extent they are determined by the caste into which a man is born, e. g. the fishermen or the *dhobies* (washermen), but not necessarily so, though a man of high caste would not willingly pursue a 'low-caste' occupation. The more educated natives follow callings for which there are no special castes, such as law or medicine. For the general population, agriculture, fishing, transport, shop-

keeping and mining are the most important occupations, and the numbers engaged in them follow approximately the order given, agriculture employing the most. Speaking generally, the native is not at the highest standard of efficiency, and is not good at shouldering responsibility, with the result that most of the highest posts in the country, whether in Government or in private employ, are held by Europeans.

Education.

Ceylon is well provided with educational facilities, there being schools of two classes, those kept up by the numerous mission bodies, and those kept up by the Government, chiefly in the places where there are no mission schools. There is no rule making attendance compulsory, but none the less a very fair proportion of children attend the schools. English is taught at many of the town schools, and it is a great ambition on the part of many natives to learn English, when they become eligible for occupations otherwise closed to them, such for instance as that of house servants. Many of the schools of better class are conducted entirely in English. The school-garden movement reached Ceylon in 1900, and there is now a very large number of schools in which gardening is taught, with considerable advantage to the boys or girls.

Remains of antiquity.

Before the beginning of our era Ceylon was in a high state of civilization, with its capital at Anuradhapura, where to this day there exist wonderful ruins, chiefly of buildings erected in connexion with the Buddhist religion, which was then the only one professed in the island. Later, with the invasions of the (Hindu) Tamils, these buildings were reduced to a state of extreme dilapidation, and the capital was moved southwards to Polonnaruwa, and afterwards to other places, in all of which there are ruins of former grandeur, less and less imposing the nearer their age is to modern times. Most of these ruins were practically unknown till the latter part of the nineteenth century, when the Archaeological Survey established by the Government began to free them of the jungle and the accumulations of earth with which they were covered,

at the same time bringing to light many hidden beauties, many buildings hitherto unknown, and many relics of the smaller articles in use in former times, most of which are now in the Colombo Museum. The ruins at these various localities are very numerous, and cover a large area of ground, but on examination it is found that a few types repeat themselves with some frequency, such as *dagobas* or shrines, *viharas* or image-houses, and *pokunas* or bathing tanks. The dagobas, which are solid brickwork erections over relics, have a kind of bell-jar shape, and often reach enormous dimensions, the largest, the Abhayagiriya dagoba at Anuradhapura, being 231 feet high (it is said to have once been 405). They were at first coated with chunam or lime (as in the innumerable modern erections, one of which may be seen at every Buddhist temple), but in the course of ages this has crumbled away, and the larger dagobas are covered with trees and other vegetation, so that they look like natural hills. The viharas are mostly reduced to the condition of naked floors surrounded by more or less erect monoliths on which the roof was once borne, and are usually entered by a flight of steps, guarded on either side by a janitor stone, and with the lowest step of all formed by what is often called a moonstone, a semicircular flat stone with a representation of processions, &c., engraved upon it, and often very beautiful, with its concentric lines of elephants, horses, lions, and bulls, and sometimes lotus flowers and sacred geese in addition. The pokunas are usually oblong tanks, with flights of steps leading down into them. Other buildings of frequent occurrence are rock temples, or temples made under overhanging rocks by building-in the enclosed space, and usually constructing a recumbent statue of Buddha in the niche under the rock. Of smaller articles made of stone may be mentioned the 'stone canoes', large monolithic troughs, in which it is supposed that rice was served to priests, statues of Buddha, and *sannas* or inscriptions (chiefly land-grants), which may, however, be also inscribed on metal or palm-leaves.

In addition to these more frequent types of building, there are others which are unique or nearly so. Some of these are very beautiful and interesting, and deserve special mention. The Brazen Palace ruins at Anuradhapura, for example, consist of 40 rows of 40 great monoliths each, upon which it is recorded that there rested a brazen palace of nine stories, used as a monastery. Round the famous sacred Bo tree (*Ficus religiosa*) of Anuradhapura, planted in 288 B.C., is a series of platforms and small shrines. Mihintale hill, east of Anuradhapura, is crowned by a series of temples, &c., led up to by flights of steps, 1,840 in all. At Yapahu there are fine carvings at the entrance to the old buildings there, while the unique erections at Sigiriya rock require special mention. Sigiriya, an isolated cylindrical rock about 400 feet high, and almost inaccessible, was taken possession of by the parricide King Kasyapa I in A.D. 459, and upon its summit he erected a citadel, the ruins of which remain, while in an almost inaccessible cave on the side of the rock he painted some frescoes, which are still visible, and are among the oldest examples of the painter's craft. Anuradhapura and other sites.

Though geographically a part of India, Ceylon is politically independent of it. Soon after its first conquest by the English it was placed under the Government of Madras, but the first result of their attempt to govern it by Indian methods was a serious revolt, and the island was taken from their jurisdiction and created a Crown Colony, in which status it remains to this day, being generally regarded as the richest and most progressive of this group of possessions. Considering its nearness to India, the intercourse between the two countries is of the slightest and, were it not for the continual stream of Tamil coolies passing to and fro, would be almost negligible. With the opening of the railway to Mannar and the establishment of a short ferry service, in place of the present long and troublesome journey by Tuticorin, this is likely to be altered. Government and administration.

The general principle upon which the government is conducted is to make use so far as possible of the old European and native officials.

native organization for local government, with the necessary strengthening of English officials at the head. In spite of every desire to encourage native talent to rise to superior positions in the Government service and elsewhere, it has as yet been found possible only very occasionally to promote a native to high position, and then most commonly in the judicial branch of the service, for the average Ceylonese (except members of the highest castes) dislikes responsibility, and does not readily rise to it as does a capable European. For the same reason, the native being as yet incapable of satisfactory self-government, there is no elective legislative council with complete control of the finances, but the colony is administered by the Governor in executive council, and he is solely responsible to the Secretary of State for the Colonies in London. The executive council consists of the Governor, the general officer commanding, the colonial secretary, attorney-general, controller of revenue, treasurer, government agent of the Western province, and one other member. In order to educate the natives to a sense of civic duty and of efficient self-government, municipal councils are provided in several large towns, to which ward members are elected by the votes of the richer and better educated citizens. But even in these cases it is found requisite to have a majority upon the council of members chosen by the Government. There have been placed upon the Legislative Council of the colony four elected members, two representing the Europeans (rural or planting, and urban or commercial), one the Burghers, and one the educated Ceylonese. But though there are also members on this council, chosen by the Government, representing the other native interests, it has been found necessary to keep an official majority, the number of leading officials forming part of the council by virtue of their position outnumbering that of the unofficial members, while at the same time the official members are obliged to vote with the Government if required, except upon questions of religion. In addition to the elected members, the official members are those of the executive council,

the Government Agents of the Central and Southern provinces, the principal civil medical officer, and the director of public works, while there are also three nominated Sinhalese (one Kandyan and two low-country), two Tamils (Northern and Eastern) and one Muhammadan.

Local government.

The local government of Ceylon is carried on as far as possible by means of the old native machinery. The island is divided into villages or small tracts of country, each of which is placed under a 'headman'. He is responsible to a headman of higher grade, and the latter again to another, who is responsible directly to the Government Agent of the province (G. A.), a member of the regular Civil Service of the colony. The headmen of a group of villages form the Gansabhawa or village council, a body which collects funds by local taxation, and is responsible for good order, for the decision of minor cases, and for the improvement of the village. The headman of highest rank in the group presides.

Provinces.

The Government Agent is the head of the province, and is responsible directly to the Government. There are nine provinces in Ceylon, named on page 475.

Civil Service.

Below the Government Agents is the graduated series of the Revenue branch of the Civil Service proper. The service consists of 92 men, divided into four classes, and 20 cadets or newly joined officials, who have to spend a good part of their time in learning the native languages, Ceylon law, accounts, &c. A cadet, until he reaches the top of Class IV, when he has usually served about six years, is placed more or less indifferently in revenue or in judicial appointments, but after this he is usually confined more or less strictly to one or the other, and if he select revenue, he may become an Assistant Government Agent, and afterwards Government Agent of a first-class province when he reaches Class I. The highest post in the Civil Service proper is that of Controller of Revenue, an officer responsible for administration of the liquor, opium, and salt revenues, for tenders, and similar subjects.

Justice.

The administration of justice in the colony is undertaken in the first place by the headmen and the Gansa-

bhawas, then by the police magistrates who are stationed in many towns, and who belong to the judicial branch of the Civil Service, and above these again by the district judges, also members of the Civil Service with the exception of those of Colombo and Kandy, who together with the judges of the Supreme Court are members of the legal profession. The Supreme Court is composed of a chief justice and three puisne judges, and there are also Crown counsel in the department of the attorney-general.

Government works.

The Government carries on much special work, demanding a special rather than a general training in those to whom it is entrusted. Thus the roads, bridges, and public buildings are in the care of the Public Works department (P. W. D.), with an engineer as chief; surveying (and meteorology) in that of the Survey department; other branches of special work are attended to by the departments of Education, Irrigation, Agriculture, Forests, Railway, Land Settlement, Customs, Audit, Police, Prisons, Post-office, Port, Stores, Museum, Archaeology, Mineralogy, Veterinary Science, and Printing, all of which but Land Settlement, Customs, and Post-office have technically trained chiefs. The law business of the Government, which is of course of very great importance, especially in connexion with the making and interpretation of new legislation, is attended to by the departments of the attorney-general and solicitor-general.

Legislation.

At the head of the Civil Service stand two 'staff' officers, the treasurer—a financial expert—and the colonial secretary, usually a man of distinction who has worked up through the Civil Service in some other colony. He is the mouthpiece of the Government in the legislative council, and from his office proceed all the orders transmitted to government agents and heads of department, while it is also the office of record for the colony.

All legislation has to pass through the legislative council, though the Crown retains a veto on any laws that may be adopted by it, and is also entitled to put forth legislation on its own account, which is binding upon the colony. Above the Legislative Council is the Executive

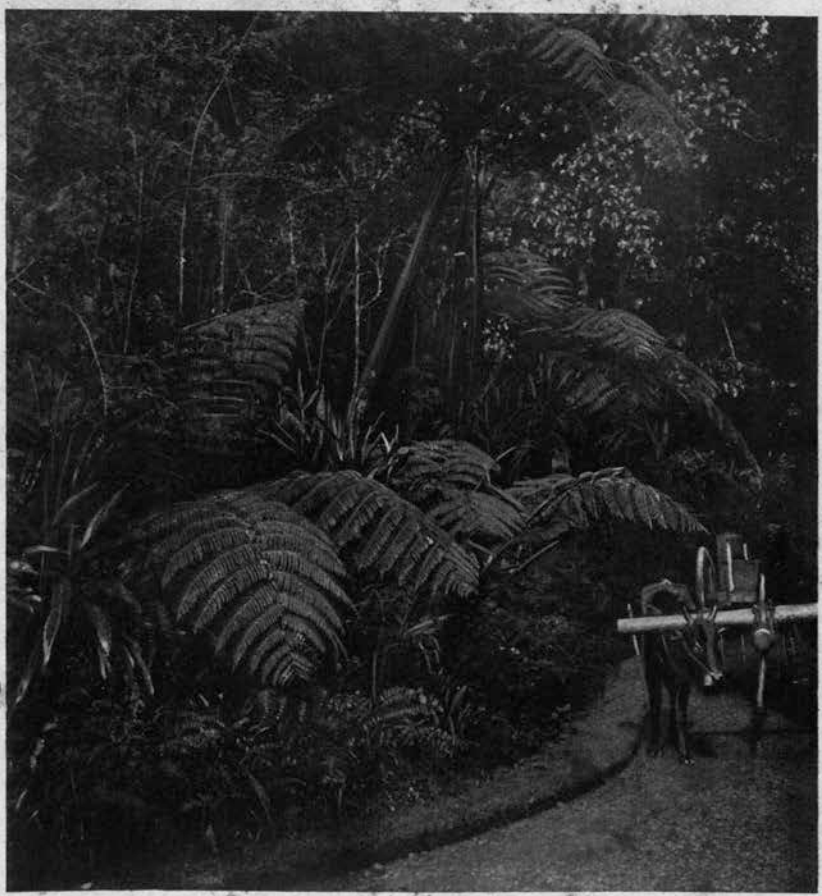

PLATE XVI. TREE-FERNS, HAKGALLA, CEYLON
(Visual Instruction Committee)

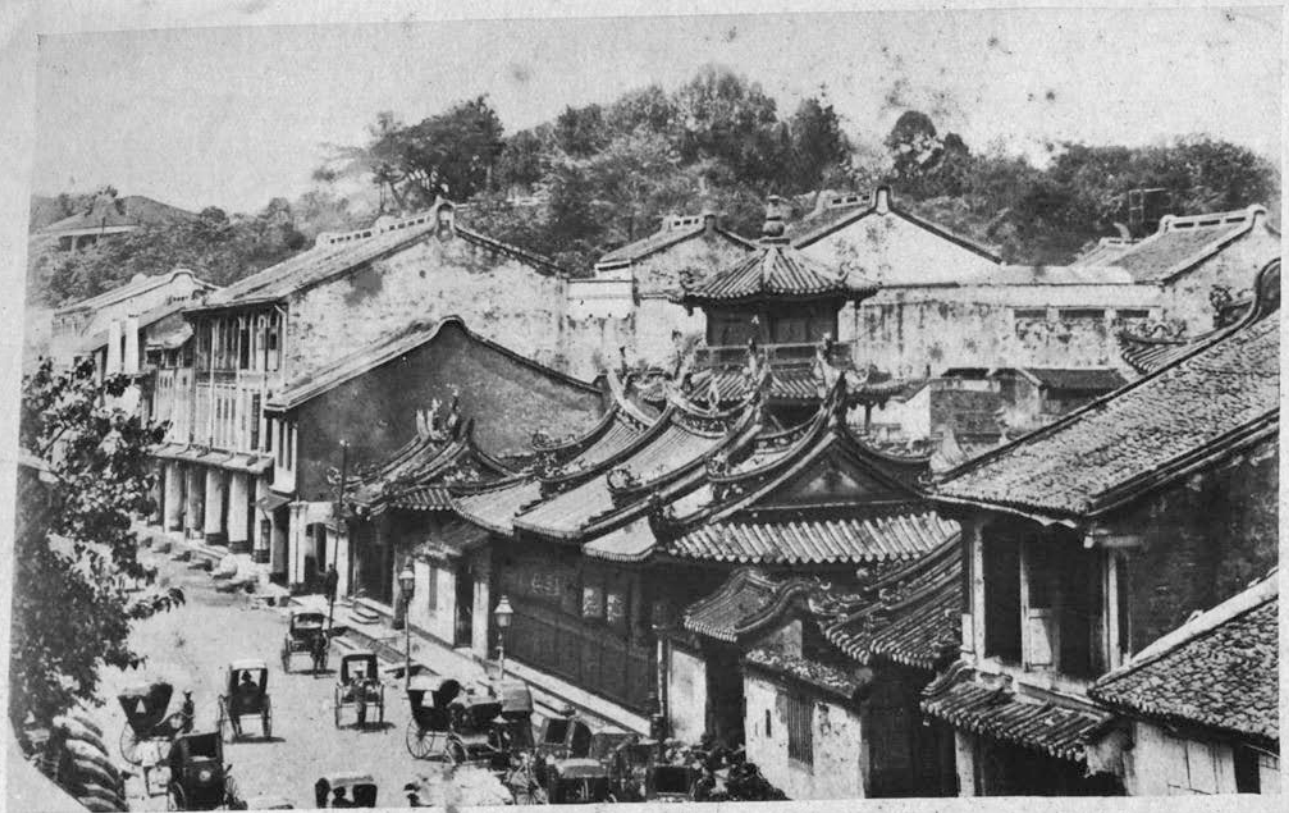

PLATE XVII. TELOK AYER STREET, SINGAPORE: CHINESE BUILDINGS

(Mr. T. H. Reid, Malay States Information Agency)

Council, whose meetings are private. In the event of the Governor deciding to act in opposition to the advice of this council, the matter must be reported to the Secretary of State for approval. It will thus be seen that subject only to the veto of the Secretary of State the Governor is practically all-powerful in the colony, and upon the personality of its Governor for the time being its progress and prosperity largely depend.

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CHAPTER XII

BRITISH POSSESSIONS IN THE MALAY PENINSULA, &c.

By W. A. Graham

The Straits Settlements and their dependencies.

Though the area of the Straits Settlements is very small, that of the territory administered, or in varying degree controlled, by the governor of that colony is considerable, for his authority has spread beyond the limit of the original colony in a surprising manner, and now covers most of the Malay Peninsula, a part of the great island of Borneo, and certain islands to the south of Java.

The colony.

The colony consists of three settlements with sundry attachments. The most important of these is the island of Singapore, some 27 miles long by 14 broad, lying at the southern extremity of the Malay Peninsula, in

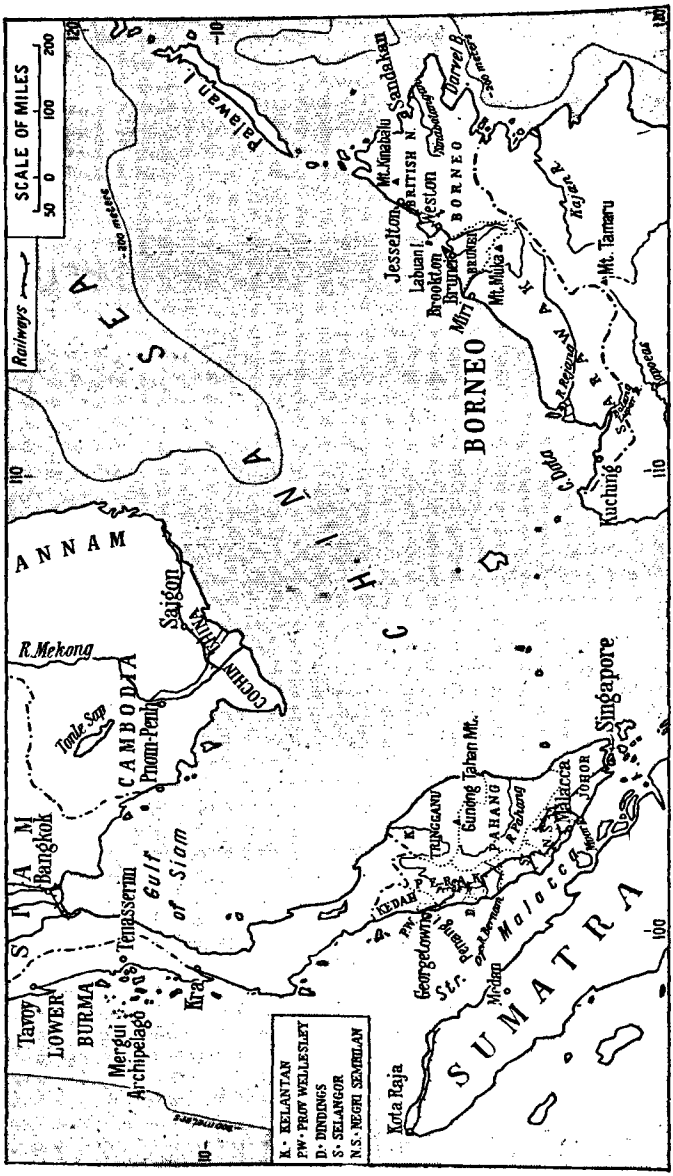


FIG. 15. British Possessions in Malaya.

1° 20′ N. lat. and 103° 50′ E. long. Next comes Prince of Wales' Island, also called Penang, some 15 by 10 miles off the west coast of the same peninsula, in 5° 24′ N. lat. and 100° 21′ E. long., to which is attached a strip of territory on the mainland a few miles away, known as Province Wellesley. The third part of the colony is the town of Malacca on the west coast mainland, in 2° 14′ N. lat. and 102° 12′ E. long., with the district lying immediately behind it, in area about 700 square miles. Finally, there is a small scrap of the mainland near the mouth of the Perak river with the islands adjoining, known collectively as the Dindings, which, like Province Wellesley, is attached to Penang for purposes of administration.

Malay States.

That portion of the Malay Peninsula, other than the Straits Settlements, which forms part of the British Empire, comprises the state of Johor at the southern end, between 1° 10′ and 2° 40′ N. lat., and 102° 20′ and 104° 10′ E. long.; the four states of Perak, Selangor, Negri Sembilan, and Pahang, known as the Federated Malay States, which together occupy the middle part between 2° 28′ and 5° 45′ N. lat. and 100° 3′ and 103° 33′ E. long.; and the states of Tringganu, Kelantan, Kedah, and Perlis, extending as far north as lat. 6° 30′. The parts of the island of Borneo[1] under the British flag are the states of Bruni and Sarawak, the territories of the British North Borneo Company, and the island of Labuan. All these lie between 7° and 2° 1′ N. and 109° and 119° 22′ E. The islands[2] south of Java are the Cocos-Keeling group of islets, lying between 12° 8′ and 10° 13′ S. lat. at about 96° 53′ E. long., and Christmas Island, 10° 25′ S. and 105° 42′ E.

Physical features and geology: Singapore and Penang.

The surface of the island of Singapore is of a generally undulating nature, pronouncedly hilly in the west and low-lying in the east. A clayey alluvium lies in the hollows between hills of sandstone and granite, and the soil, though not naturally highly fertile, has been improved by long-continued cultivation. There are a few small streams in the island and extensive swamps on the north-east side. The island of Penang is simply a hill rising

[1] See Chap. XIII. [2] See Chap. XIV.

some 2,000 feet above the sea, with certain level areas of no great size between its slopes and the edge of the water. The soil is sandy but fertile, but a considerable portion remains uncultivated.

The Malay Peninsula.

The peninsula mainland presents a broken range of mountains running north and south, with rivers winding among foothills on both sides and thence, through valleys of varying width, to the sea. Most of the streams flow east and west, but the Perak river flows southwards through the greater part of its course before turning westward into the Straits of Malacca, while the Kelantan river runs almost due north before it reaches the China Sea on the east coast. The Perak river is over 200 miles long, and the Kelantan about 150. Other streams are the Muar, Malacca, Klang, Selangor, Bernam, Kinta, Krian, Prai, Muda, Kedah, and Perlis on the west, the Muar and Bernam over 100 miles long; and the Besut, Tringganu, Kemaman, Kuantan, Pahang, Endau, and Sedeli on the east. The Bernam river is the farthest navigable in the peninsula, and the Pahang river is the longest, being over 250 miles from source to mouth. Sand-bars more or less block the mouths of all the streams on the east coast, while those on the west flow out through soft mud-banks.

Here and there, as in Kelantan, Pahang, Johor, and Kedah, broad levels exist, but for the most part the country is broken and hilly. The central mountain range is of granite formation, apparently a gigantic intrusion through strata of sandstone and slate, wide beds of which characterize the lower levels east and west of the range. There is also much limestone, occurring in frequent series of precipitous hills, the fantastic shapes of which lend to the Malayan landscape its most striking features, and in which many huge caves exist. The highest mountain in the country is situated on the border between Kelantan and Pahang, not far from the middle of the broadest part of the peninsula. It is called Gunong Tahan, 'The Forbidden Mountain,' and before the year 1909 was practically unexplored. Since then, however, it has been

visited frequently, and a scheme has been put forward for converting it into a hill sanatorium.

The eastern shores of the peninsula, washed by the turbulent China Sea, are edged with clean, bright, sandy beaches or bold promontories of tree-covered rocks, while on the west side, where lie the quiet waters of the Straits of Malacca, the surface slopes seawards by almost imperceptible degrees, changing gradually from dry land through mangrove swamp to wide levels of soft mud uncovered only at low tide.

Here and there the coast is fringed with islands, precipitous and rocky, or flat and low-lying, but all thickly covered with vegetation. In places these are grouped together to form small archipelagos of surpassing scenic beauty. The whole mainland also is densely wooded except for those comparatively small areas which man has cleared for cultivation or for mining. Climate and hydrography.

The territories of the Singapore Government, though separated by wide distances and by several degrees of latitude, lie within 12°, either north or south, of the equator, and have a very similar climate, which, owing doubtless to the fact that they are all subject to strong marine influences, is not one of extremes. The mean maximum temperature varies from 87° F. in Negri Sembilan to 99° in Kedah, and the mean minimum from 64° in Pahang to 72° in British North Borneo and Labuan.[1]

[1] Thermometer readings in the British territories of the Malay Peninsula and neighbourhood during the year 1910:

Locality.	*Maximum.* °	*Minimum.* °
Perlis	99	66
Province Wellesley	96	69
Penang	95	63
Perak	95	69
Pahang	94	61
British North Borneo	94	72
Labuan	93	72
Singapore	92	71
Kelantan	92	68
Christmas Island	91	70
Kedah	90	73
Selangor	89	71
Cocos-Keeling Islands	89	70
Negri Sembilan	88	69

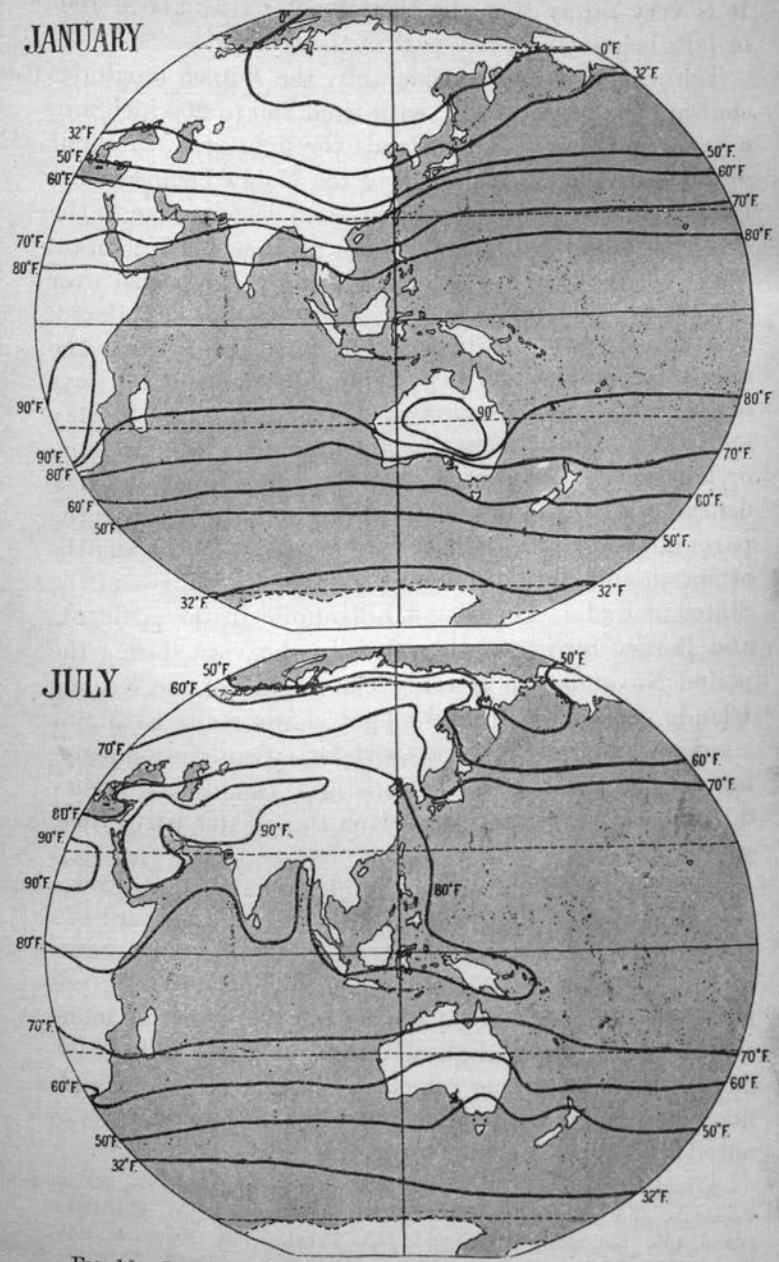


FIG. 16. Isotherms (mean temperature) over South-eastern Asia, &c., in January and July.

It is very rarely that the thermometer rises above 100° or falls below 60° in any part of the territories.

Rainfall.

The rainfall varies considerably, the Borneo territories showing the heaviest fall, with from 150 to 200 inches in a year, and the Keeling Islands the lightest, with about 40 inches. On the mainland of the Malay Peninsula the rainfall is heavier in the northern and eastern than in the southern and western states, the average for Kelantan, Perlis, Penang, and Province Wellesley being well over 100 inches, and for Selangor, Negri Sembilan, Malacca, and Johor about 80 inches. In Singapore, where the annual fall is some 135 inches, rain falls on about 170 days of the year, being heaviest in January and least in May and June. Throughout the territories the rain is more or less evenly distributed over the whole year, the tendency to a regular dry season being more marked in the parts farthest north. Once in every few years the months of March and April are almost if not quite rainless in the States of Kedah, Perlis, and Kelantan. In the peninsula and Borneo territories the rainfall is heaviest during the period November to March. The rainfall of the Keeling Islands consists of frequent light showers alternating at comparatively rare intervals with heavy rains accompanying furious wind-storms. Christmas Island has a very distinct wet season, during which the greater part of the year's rain falls.[1]

Humidity.

The extent of atmospheric humidity varies from excessive dampness in Singapore and the Borneo territories to comparative dryness in the Keeling Islands. The states of the peninsula mainland, though distinctly damp, are not excessively so, except during the height of the monsoon weather, when, the sun being sometimes hidden for days behind low-flying rainclouds, the rivers all in high flood, and much of the land inundated, the air is impregnated with moisture to a surprising degree.

[1] Average rainfall in inches for the British territories in the Malay Peninsula and neighbourhood: Sarawak 200, Labuan 151, Christmas Island 136, Singapore 128, Perak 112, Pahang 110, Kelantan 109, Penang 108, Province Wellesley 103, Kedah 103, Selangor 91, Perlis 91, Negri Sembilan 79, Malacca 76, Cocos-Keeling Islands 40.

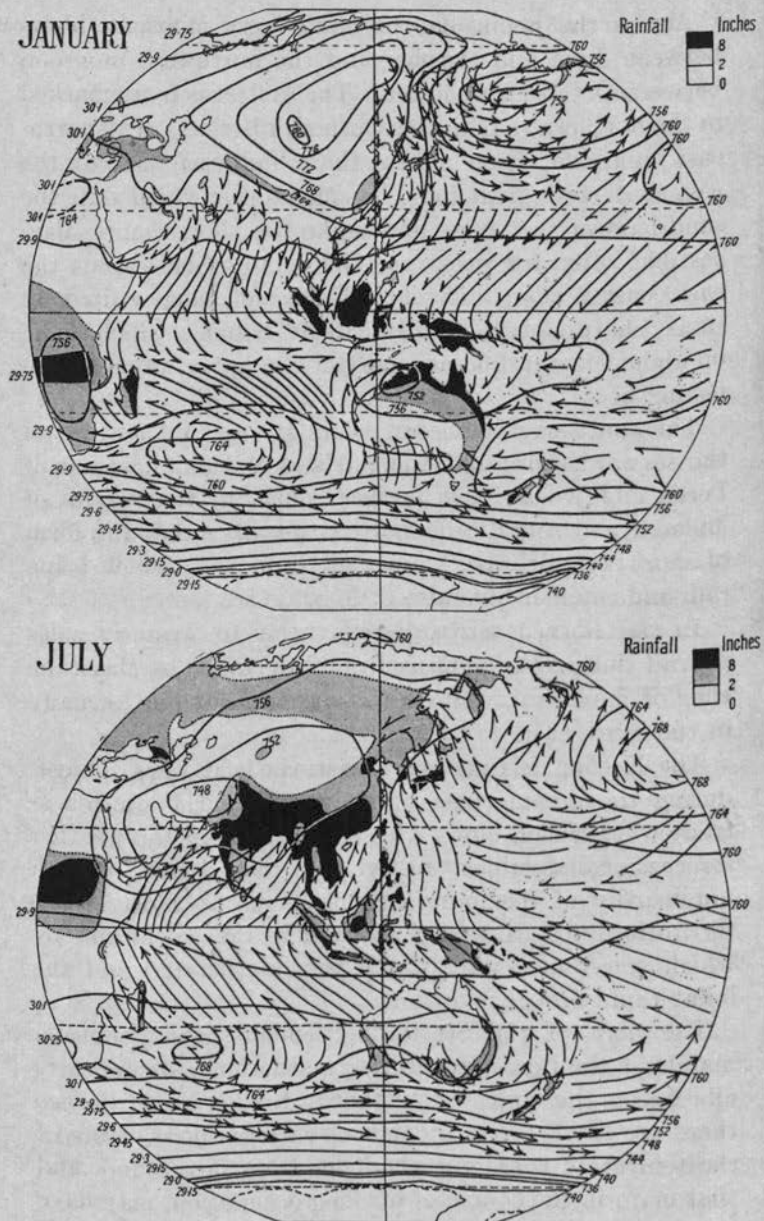


FIG. 17. Isobars (mean pressure, thus, 29·0 ins., 736 mm.), prevalent Winds (relative force indicated by number of barbs on arrows showing direction), and mean Rainfall over South-eastern Asia, &c., in January and July.

Across the peninsula the south-west monsoon blows between June and October and the north-east monsoon between October and March. Their effect is more marked in the northern than in the southern districts. The north-east monsoon, from across the China Sea, strikes the east coast with great force, raising storms which shift the sand-bars of the rivers and make the shores quite inaccessible, often for weeks together. At other seasons the east coast is comparatively calm except when visited by short, sharp squalls, locally called 'Ribut', which come on about May and occasionally create havoc amongst the fishing boats. Winds.

The south-west monsoon beats strong and steady on the seaward shore of Penang Island and on the coast of Perlis and Kedah, but farther south, in the Straits of Malacca and round Singapore, it usually takes the form of short fierce storms, known as 'Sumatra', which bring rain and thunder but raise little or no sea.

In the Borneo territories northerly to westerly gales prevail during the months from November to May, the time of most rain, while in the spring the wind is usually in the south-east.

The Keeling Islands and Christmas Island are subject, during the greater part of the year, to the south-east trade wind, which blows with regularity, but the weather is occasionally subject to cyclonic disturbance, though not usually of the more violent form. In most of the territories tales are told of more or less recent storms by which tracts of country have been devastated and the inhabitants brought to ruin.

The flora of the Straits Settlements, the peninsula mainland, the Borneo territories, and Labuan are in nearly all respects the same, except that in British North Borneo there are small tracts at high elevation where plants of the temperate zone, e.g. rhododendrons, are found, and that man, in the course of his long occupation, may have exterminated from some of the islands a few species which formerly flourished there, as now upon the mainland. Vegetation.

All these territories were originally under dense forest,

in which man, starting from the shores and the river banks on which he first settled, has made clearings more or less extensive. Wars and the ordinary movements of population have caused such clearings to be deserted from time to time, when the forest has quickly recovered its sway, thus causing the tracts of secondary jungle growth which are of common occurrence. In other parts the clearings have been extended until, for many miles, no sign of the forest is to be seen, instances of such being the plain in the north of Kelantan, portions of the Malacca district, wide areas in Johor, the whole island of Singapore, and parts of Sarawak.

Forests. The forests are of the tropical evergreen description, with the exception of those fringing some of the sea-shores, which consist of the vegetation peculiar to tropical littoral forests. The former present several distinct variations, recurring with some regularity throughout the peninsula. The mountain ranges and wilder recesses of the country are clothed with an almost impenetrable mass of huge forest-trees, including many species of *Dipterocarpus*, *Pterocarpus*, *Xylia*, *Ficus*, and *Hopea*, with a dense underwood of shrubs, bushes, and shade-loving plants, the whole interlaced by cables of numerous species of cane, latex-bearing vines, and flowering climbers. Near the course of some of the streams this forest gives way to dense bamboo brakes often extending for miles. Where secondary growth or 'Blukar' has replaced the primeval forest, a host of quick-growing, softwood trees flourish, and these thin out in places to wide stretches of wind-swept grasslands. Again in parts, species of *Lagerstroemia* form the predominating growth, dyeing the landscape, during their flowering season, with broad splashes of vivid purple.

Flowers and fruits. As a rule the forest is poor in conspicuous flowers, even the orchid family being but thinly represented, and it is in the 'Blukar' tracts and among the ill-kept orchards of the inhabitants that the more ornate part of the flora is to be found. Here innumerable climbers, of which *Congea*, *Thunbergia*, *Grenadilla*, and various *Ipomaea* are

a few, grow in profusion amongst wild flowering trees and semi-wild fruit-trees, mingling their flowers with the heavy-scented blossoms of the T'mbusu, with the bright red cups of the tulip-tree, or embracing, and frequently choking, rambutan, rose-apple, langsat, mangosteen, and other fruit-trees. The Malay orchard, or 'Dusun', indeed, is a curious combination of the efforts of man and nature. Laid out at first with young fruit-trees, a careful abstention from weeding and cultivation makes it in a few years a fair imitation of a corner in a wild forest. The stately durien trees are its most striking feature. Beneath their shade and among their graceful trunks, crowds the mass of lesser fruit-trees struggling for existence with the wild climbers above noted, while below all these again is probably a tangle of pineapple plants, disputing the ground with coarse ferns, gigantic mosses, and broad-leaved ground-plants mostly of the ginger order.

On some of the low levels subject to floods, on the peaty soil of the east coast especially, the 'Kayu Glam' makes a thin shadeless forest, its gnarled trunks, white bark, and small scanty foliage suggesting the landscape of Dante's infernal regions.

Palms. Palms are numerous in the peninsula. Several wild species are found in the forests, and the nibong, the sugar palm, the areca, and the coco-nut are cultivated. The nipah, a palm-like plant, and the screw-pine, both of the *Pandanus* order, are of common occurrence and are used by the people, the first for thatching houses and the second for making baskets, mats, and other articles of household use. Gutta-percha, cinnamon, cloves, gambir, camphor, nutmegs, 'siri' or betel-leaf vines, are all common products, some occurring in the wild state, and the others cultivated. Yams of many kinds, and gourds, the latter including melons, cucumbers, pumpkins, and several varieties unknown to Europe, are exceedingly common, both wild and in cultivation, while tapioca, sugar-cane, cotton, tobacco, coffee, indigo, and pepper are cultivated. Bananas are grown in infinite variety.

Littoral vegetation. Where the sea-shore is a sandy beach, the Australian

casuarina finds a home to which it clings persistently, though storms frequently destroy whole patches of it by washing the soil from beneath its roots.

Littoral forests are spread along the west coast of the peninsula and some parts of the shores of the Borneo territories. They consist almost entirely of arboreal varieties of the order *Rhizophoraceae*, with a few species of *Lytheraceae* and *Verbenaceae*, collectively known as 'mangrove'. Many of their species reach a considerable size, and with their closely interlacing branches form the most impenetrable of jungles. They thrive among the salt-water marshes and low mud-banks around and near the mouths of the rivers, where their wide-extending and peculiarly-formed roots assist the accumulation of silt and the gradual formation of new land. The forests are intersected by sluggish, winding creeks, and, with their dull green foliage unrelieved by conspicuous flowers and almost untenanted by animal life, wear a sombre and gloomy aspect.

Oceanic islands.

The total flora of the Keeling Islands was found by Darwin to consist of some thirty species, inclusive of plants brought by settlers for cultivation. The number of these last has increased since Darwin visited the islands, but it is doubtful if any addition has been made to the wild flora. The plants of the islands not introduced by man have all apparently grown from seed cast up by the sea. Foremost amongst them is the coco-nut, which the first visitors to the islands found already long established there, and which is now largely cultivated. All the plants have been identified as native of the islands of Sumatra and Java or of the Malay Peninsula.

The flora of Christmas Island is much larger than that of the Keeling Islands and possesses several species and varieties peculiar to itself. This is due to the fact that while the Keeling Islands are of coral formation and recent, Christmas Island is of greater geological antiquity (compare Chapter XIV).

Fauna: mammals.

Of the Primates a large number of species, including the gibbon, several langurs, the pig-tailed baboon, and crab-

eating macaques, are common to both peninsula and islands, as is also the slow loris (*Mycticebus tardigradus*), but the celebrated orang utan, or 'wild man', perhaps the most human of apes, though existing in Borneo in several varieties, is not found in the peninsula. The long-nosed ape is said also to be found in Borneo, but not on the mainland.

Of the carnivora the cats and civets, dogs, otters, and bears are all represented. The Bengal tiger is not found in Borneo, though it is frequent in the peninsula, the largest cat in the island territories being a small panther. The civets, a large family, have many species in both territories, notably *Paradoxurus* (the palm cat), *Viverra ibeta*, *V. malaccensis*, and the rasse. The last secretes a fluid which is much prized locally for its odour. *Canis javanicus*, a wild dog, is known, but is rare in both localities. The Malayan or honey bear is common. The Insectivora and Cheiroptera are well represented with moles, shrews, and bats; *Galeopithecus volans*, the miscalled flying lemur, and *Pterus edulis*, the flying fox, being among these. Squirrels, porcupines, rats, and mice are amongst the commoner rodents, and hares are found in the peninsula but not in the islands.

The edentata are represented by a species of pangolin, or scaly anteater, a little armadillo-like beast, of harmless nature but most offensive smell.

The ungulata include the elephant, common in the peninsula but rare in Borneo (where it is thought by some to be descended from animals escaped from captivity long ago), the rhinoceros, and the Malayan tapir. No form of horse is indigenous. The Indian pig, the mouse-deer, barking-deer, hog-deer, and sambhur, are found throughout the territories, but the babirusa, a large four-tusked pig, occurs in Borneo but not in the peninsula. The serao or goat-antelope, on the contrary, is found in the Malay States and not in Borneo. A bison, *Seladang*, inhabits the remoter jungles of the peninsula, and a wild ox occurs in Borneo.

Dolphins are common in the waters round the coasts,

and the dugong is found on the shores of Borneo and, more rarely, on the west coast of the peninsula.

Birds. Crows, ravens, coucals, sparrows and other finches, the king-crow, the fantail and other flycatchers, tailor-birds, weaver-birds, orioles, mynas, swallows and swifts (amongst the latter the edible-nest swift), eagles, kites, falcons, vultures and owls, cranes of all sizes, hornbills, pheasants, jungle-fowl, francolins, quails, pigeons, parrots, woodpeckers, snipe, sandpipers, and coots are found in all the territories under consideration; gulls and terns abound on the coasts; whistling teal, cotton teal, and mallards are found on most of the inland waters.

Reptiles and batrachians. Reptiles and batrachians include the snapping tortoise, the hawksbill turtle, the loggerhead, and many land tortoises. The common Indian crocodile occurs, and also lizards of many kinds and sizes, some Borneo species of which seem to be connecting links with the Australian fauna. The large crowing gecko lizard, which is found in dwelling-houses all through Farther India, is common here also, as are many varieties of smaller gecko. Snakes of many kinds, the python, cobra, green whipsnake, banded adder, krait, Russell's viper, green viper (*Lachesis*), down to the harmless *Typhlops*, are amongst the more common land-snakes found in all the territories. Of sea-snakes the number and variety are known to be immense, but they have not hitherto been closely studied. Bull frogs, green frogs, tree frogs, flying frogs, and many toads are very common throughout the territories. Marine life is abundant in all the waters which wash the shores of the territories. Hammer-headed, zebra, and thresher sharks are common; skates and rays also abound and often attain immense size. The sawfish occurs, sometimes as much as twenty feet long. Eels, catfishes, batfishes, sun-fishes, devil fishes, mullet of various sorts, and horse-mackerel are a very few of the almost innumerable species which swarm, and against which a large part of the human inhabitants wage constant war.

Invertebrates. The invertebrate section is well represented. Limpets, snails, chitons, squids of many sizes, and bivalves innu-

PLATE XVIII. BOTANIC GARDENS, SINGAPORE

(Visual Instruction Committee)

PLATE XIX. BOTANIC GARDENS, SINGAPORE

Visual Instruction Committee)

merable, including edible oysters and mussels; prawns of all sorts; crabs both land and water, and the hideous kingcrab, are all common; spiders, including the tarantula; scorpions black and grey, ticks, bees, wasps, and hornets; black, red, and brown ants, amongst the largest of which is the red tree-ant; beetles, glow-worms, woodborers, chafers, fireflies, weevils, and ladybirds are all present in great variety. Mosquitoes, gnats, house flies and fleas, butterflies and moths, including the leaf-butterfly and the hawk-moth, and caddis-flies are common; as are locusts, crickets, mantis, cockroaches, white ants, stone-flies and dragon-flies. Bugs and centipedes are numerous, and worms, leeches, sea-anemones, sponges, coral, and other members of the lowest order of animals, infest both land and water.

Economic Conditions

Agriculture.

All the races which inhabit the territories governed from Singapore are rice-eaters, and therefore it may be expected that rice will be found the principal agricultural product of these regions. Such is, in fact, the case as regards the more primitive of the inhabitants who, having no wants, have no incentive to produce anything but food in quantities sufficient for their own immediate use. But people rising above the most primitive conditions will produce, for purposes of barter chiefly, more food than is required for home consumption; and since the natural formation of the territories under consideration makes it impossible that they should ever become great centres of rice production, the Malays and other races which have so risen have perforce turned to other means than the cultivation of extra rice for the satisfaction of their wants. Such means they have found in the successful cultivation of other products for which their country has been found fitted. These are coco-nuts, tapioca, pepper, gambir, coffee, betel-nut, nutmegs, sugar, and latterly tobacco and plantation rubber. The great fertility of the soil and the commercial value of these products becoming known, foreigners, especially Chinese, soon came in and developed

their cultivation far beyond anything the natives could do, and finally the planting of rubber and coco-nuts brought numbers of Europeans into the field who, with their energy and capital, converted the territories into one of the gardens of the world.

Rice. The chief rice-growing districts are Kedah, Kelantan, Malacca, and Muar on the mainland of the peninsula and the Baram district in Sarawak. From these places a small amount of rice is exported, but elsewhere the cultivators produce no surplus, and in those localities where mining, planting or trade have caused accumulations of population, food-rice has to be imported.

Malay rice-lands are of three kinds, each of which demands a distinct method of cultivation. The best and most productive is wet land or 'Chedong', upon which standing water, supplied either by irrigation or rainfall, is maintained within low embankments while the crop is growing. Such land is cultivated annually. The second quality land is ordinary plough-land or 'Tugalan', which is cropped triennially without flooding; and the third quality is jungle-land or 'Ladang', which is simply a patch of fresh-cut jungle, burnt, cleaned very roughly, planted for one or two seasons and thereafter deserted for a new spot.

The implements used are primitive. The plough is a light wooden instrument, shod with a small iron share and turning up a furrow of some three inches depth. It is drawn by a pair of bullocks or a single buffalo. After first ploughing, the land is left for three or four months, by which time if 'Chedong' it has been flooded and well soaked with canal- or rain-water, and can be churned up with a tooth-harrow and brought to a condition of very soft porridgy mud, into which the young rice plants, already germinated in a nursery close by, are transplanted. If 'Tugalan', the ploughed land is treated much as a corn-field in Europe, the soil is broken up, weeded and cleaned, and the grain is sown broadcast upon it. The young plants are thinned out when a few inches high, and one or two subsequent weedings complete the operations

necessary before reaping. For 'Ladang' cultivation the patch of land, after burning and cleaning, is roughly hoed over and sown by the process of dibbling; a fence is made round the field to keep out deer and pig, and the rest is left to nature.

Reaping is a slow process, each head of grain being cut off separately with a small-bladed knife to save the ears from being shaken whereby a few grains might be lost. Winnowing is achieved by tossing the grain in the air after it has been separated from the straw by being trodden by cattle. The grain is stored away in the husk, in which condition it can be kept good for as long as three years. When required for use it is husked in a rough hand-mill or by pounding in a wooden mortar. The crop varies in quantity and in quality, but never fails altogether, though sometimes the prevalence of cattle disease makes for severe shortage.

Live-stock.

Many parts of the territories under review are well suited for the raising of live-stock, and the people take advantage of this, though their methods are careless and inadequate. The live-stock consists of buffaloes and oxen, the latter of the small, humped variety, which are used for ploughing, for carting, and for food. Goats of a very mixed breed are to be found in most villages, and in the districts of the east coast of the peninsula a small and wiry breed of sheep is maintained. Great numbers of hardy fowls and ducks are reared in a haphazard, careless manner, or rather are permitted to exist in the villages, where they play the part of scavengers. The Chinese, being habitual pork-eaters, raise a good many pigs in the Straits Settlements and Federated States, but wherever Moslem prejudice is paramount, the breeding of this useful animal is discouraged or even totally barred.

Cultivated vegetable products: coco-nuts.

Coco-nuts grow practically everywhere in the territories under examination, and requiring very little attention while in process of cultivation, naturally recommend themselves strongly to the Malay. The trees are therefore grown, or are permitted to grow, in all native villages, and Singapore, Penang, and other local emporia have for long

been centres of a copra (or dried coco-nut) and oil trade. When Darwin visited the Keeling Islands in 1845 he noted that the coco-nut, then as now the only vegetable product of the islands, was exported to Singapore 'for local consumption as oil and for mixing in curries'. Since those days the value of the coco-nut has been discovered by the rest of the world and an almost insatiable demand for the commodity has grown up. The prospects of coco-nut planting have attracted the attention of both Chinese and Europeans and the cultivation has extended very much, the area planted having reached in 1912 nearly 400,000 acres for the whole of the territories in question.

Tapioca. Tapioca has long been known to the Malays, but was not extensively cultivated until taken up by Chinese immigrants. It is a low bushy plant with large tuberous roots, from which the product is obtained, and one of the chief features of its cultivation is that after from two to three crops in succession the soil is useless for further tapioca cultivation. It was at one time considered that tapioca growing ought for this reason to be discountenanced, but the discovery that the soil, though impoverished for tapioca, was not necessarily so for other products, has brought about a change of feeling in this respect, and the output of tapioca, especially from Sarawak and British North Borneo, continues to increase.

Spices. Pepper, the cultivation of which demands care and attention, finds small favour with Malays, but has no terrors for the Chinaman so long as prices are remunerative. This, however, is not always the case, for, the demand being limited, the market is liable to frequent fluctuations which sometimes throw large areas of pepper gardens out of use. The plant is a vine with fine dark foliage. It is grown on poles planted a few feet apart, and the gardens are kept well weeded and watered. The plant matures in three years. Pepper-growing is not a form of industry which has attracted much European enterprise.

Nutmegs grow in most parts of the territories, but not

in all. The plant is a small tree of very handsome appearance, with dark glossy foliage amongst which the yellow, apricot-like fruit hangs conspicuously. At one time the cultivation of nutmegs was very profitable, and large plantations were maintained by Chinese and by Europeans, those of Penang being amongst the more celebrated. As in the case of pepper, however, the price is now uncertain, and many gardens have recently been deserted or put to other uses.

Gambir. Gambir, one of the three plants from which the catechu of commerce is produced, is cultivated extensively in many parts of the Malay Peninsula and Borneo, and not only is it exported for use in dyeing, but it is largely consumed locally as a condiment chewed with betel-nut. The plant is a vine, and the prepared article, which appears in commerce in the form of pale yellow cubes or thin circular biscuits, is obtained by boiling the leaves and evaporating the resultant liquid to dryness. The plant yields a return about nine months after planting. The cultivation is almost entirely in the hands of Chinese.

Betel. Every Asiatic inhabitant of the territories under review chews betel, and consequently the beautiful betel or areca palm is to be found growing near every house. Though it is very rarely to be seen in plantations of any size, yet some localities produce a good deal more than others, and thus it is an article of considerable internal trade. A certain amount is also exported for the manufacture of catechu. The tree produces from the age of about four years, one, two, or three bunches annually of some hundred nuts each, which, when ripe, are golden yellow in colour and about the size of hen's eggs.

Sugar. Sugar-cane is grown in small quantities nearly everywhere, and occasionally in fair-sized plantations. The greater part of the coarse, unrefined sugar obtained from the plant is consumed locally, but there is an export of some twenty thousand tons annually from the whole territories, an amount about equal to that of the refined sugar imported.

Coffee. At one time it was thought that the planting of Liberian

coffee in the Malay Peninsula would prove highly remunerative, and a large area of land was taken up by European and Chinese planters and laid out with this product. The results, however, were disappointing and much capital was lost; but the industry still persists, and in the Federated Malay States alone there were in 1911 some ten thousand acres under this form of cultivation.

Tobacco. Tobacco is grown in and around every native village for local use, and in Borneo the cultivation, after many vicissitudes, has become a well-established and a profitable employment for European planters. The tobacco of Darvel Bay in British North Borneo is known in England. Three companies control the production and the trade, and the value of the crop produced in 1912 was over £300,000. British North Borneo produces outside wrapping leaves for cigars of a quality not to be surpassed. The tobacco of the people is grown without care and is dried in the most primitive manner, and yet, when by chance it has not turned sour or mouldy, it can be smoked by Europeans with appreciation.

Rubber In cultivating rubber the Malay Peninsula and the Borneo territories have played a prominent part in one of the romances of modern commerce. The story of the introduction of the *Hevea brasiliensis* rubber tree into Malaya, of its long neglect, its gradual adoption by planters as a possible improvement on coffee, of the phenomenal rise in the price of the commodity followed by the 'boom' of 1910, is one of the most interesting in recent economic history. Those planters who had already taken up rubber-planting before the boom arrived nearly all made fortunes, while there came a rush of others to take advantage of this new-found way to wealth. Coffee estates were hastily interplanted with rubber, coco-nut plantations were laid waste to provide space for the new product, while some hundreds of thousands of acres of jungle land were applied for and obtained from the government to be turned into rubber plantations. All through the Federated Malay States, more especially in Selangor; in the island of Singapore, in Province

Wellesley, in Johor, in British North Borneo and Sarawak, to a limited extent even in Kedah and Kelantan, at that time not yet under British rule, estates were opened up. The area actually under rubber in all the territories under review, which in 1905 amounted to some 50,000 acres, was in 1912 over 400,000 acres, the land leased for ultimate planting being some 700,000 acres. This large area was comprised in upwards of 600 estates, the capital invested in which was not less than £30,000,000. As the result of experiments extending over many years, the *Hevea brasiliensis*, one of the rubber-producing trees of South America, was generally adopted in preference to many other local and foreign rubber trees which had been tried. The seed was obtained by planters from the economic gardens at Singapore and from Perak, plants having been introduced there at considerable trouble.

Fruits and other products.

Besides the articles enumerated above, many others of rather less economic importance are produced by the inhabitants of these countries. Amongst them are maize, pineapples, tree-fruits of many kinds, 'siri' or betel vine, and all sorts of garden produce. Maize is usually grown in small patches for home consumption only. Pineapples are grown in enormous quantities in orchards, where they form a tangled undergrowth, and in regular orderly plantations, the latter usually owned by Chinese. A very large part of the island of Singapore was covered with pineapple gardens (whence the celebrated 'Singapore Chunks' of commerce) until the rubber boom caused the conversion of some thousands of acres of these, as also of extensive nutmeg orchards, into rubber plantations.

The fruit orchards or 'Dusun' of the Malay, which have been alluded to above, produce durians, langsats, rambutans, rambai, guavas, mangosteens, rose-apples, jack-fruit, Cape-gooseberries or 'blimbing', chikus, pumeloes, limes, oranges, papayas, and bananas of many varieties, from trees planted indiscriminately and allowed to grow much as chance may decide. From the point of view of the scientific agriculturist these trees ought all

to die, or at best to maintain but a feeble and barren existence, but such is the fertility of the soil that this is not the case and the local bazaars are at all seasons full of fruit of various kinds.

Garden produce includes pumpkins, water-melons, cucumbers and many other gourds of weird shape and curious flavour; sweet potatoes, yams, onions, and garlic; beans of various sorts; chillies, ginger, and sundry herbs: all grown in small ragged plots round about the houses of the natives, and in clean and well-kept market gardens by Chinese wherever the propinquity of a town makes such industry worth while.

Cotton. The climatic conditions are not favourable to the cultivation of cotton, though an attempt has been made to produce it on Christmas Island. The only cotton grown by the Malays is a perennial variety, a plant or two of which is to be found in the gardens of most houses, where it is grown to provide cotton for stopping the ears and nostrils of corpses previous to burial.

Jungle produce. The jungles of Malaya and Borneo are particularly rich in products of economic worth. There are many hard-wood timbers, some of which are nearly equal to teak, while all are of considerable actual, and more potential, value. There are also many soft-wood timbers much used locally and exported to neighbouring countries.

The collection of wild rubber and of gutta-percha is an industry in nearly every district, the former being procured chiefly from trees of the *Ficus* family, locally known as 'Rambong', 'Jalutong', &c., and from certain vines, *Willoughbeia, Lensonotes, Parameria,* and others, and the latter from members of the order *Sapotaceae,* notably the *Dichopsis gutta* or 'Taban'. Both rubber and gutta have been collected with so little care or control on the part of the authorities that the sources of both now tend to become extinct, many millions of trees having been wantonly destroyed.

Camphor, resin or 'Damar', and wood-oils are also profitable jungle produce. Camphor is secured by boiling the leaves of the *Cinnamonum camphor,* a shrub introduced

from China, but it also occurs as an exudation in the fissures of an enormous forest tree, *Dryobalanops aromatica*, a native of Borneo. 'Damar' is of almost infinite variety, one of the best sorts, an exudation from *Hopea odorata*, being a very valuable article of commerce. The more common varieties are locally used in large quantities in the making of pitch and torches. Wood-oil, obtained from many trees, but chiefly from those of the *Dipterocarpus* family, is used as an ingredient for varnish.

Rattan (Malay 'rotan') canes, some of considerable value, others of very little, are found in all parts, but want of conservation in the past has caused a heavy falling-off in the quantity of the better sorts now coming into the markets.

In Sarawak and British North Borneo a small quantity of mangrove bark is collected for export, and it is probable, in view of the great area in Malaya and Borneo covered with mangrove swamp, that this industry might be profitably extended.

Eaglewood, beeswax, edible birds' nests, sago produced from a wild, or semi-wild, palm tree, and guano, are products of one or more districts, and are all articles of commercial value.

Mining gold.

The mineral wealth of the territories governed from Singapore is already great, but there is reason to believe that only a small portion of it has so far been exploited. As a gold-producing country the Malay Peninsula was known to the ancients, being in fact, no other than the Golden Chersonese of the Greeks. In the states of Kelantan and Pahang, and to a less extent in other spots, traces of ancient workings are visible, the history of which is not known but which were in all probability left by foreign miners, possibly Chinese, working under sanction of the ancient overlord of the country, Siam. Most of the rivers of both the peninsula and the island of Borneo contain gold, and a continuous dribble of the metal finds its way thence into the world, the result of the very intermittent labours of the country people, but it is only here and there that gold is found in quantities

sufficient to warrant its being mined by Europeans. The lure of the metal is strong, however, and much money has from time to time been invested in one or other of the numerous companies which have been constructed on the strength of gold seen, or obtained from the natives, by travellers in Malayan lands. Some of these companies have been, and are, successful, some just manage to keep alive, but most have died after a brief career. The officially known annual output of gold in 1911 was about 50,000 ounces, and by far the greater part of this came from Baw in Sarawak. Pahang produced some 15,000 ounces, Kelantan from 3,000 to 4,000, and the rest of the territories practically nothing.

Tin: early exploitation.

The world's supply of tin collected from all the corners of the earth is about 95,000 tons per year, and since of this British Malaya contributes over 50,000 tons, it is clear that the territories now under review must be amongst the richest tin-bearing lands in the world. So far as is at present known this is the case, and, moreover, the Malay Peninsula is probably the most ancient tin-producing ground in existence. Tin was used in Europe during the 'Bronze' age, for it is itself a component of bronze; but Chinese records of a date prior to the European 'Bronze' age (usually fixed at about 2000 B.C.) allude to the tin brought by their merchants from what is now called the Malay Peninsula. Before the intervention of Great Britain in the affairs of the Malay Peninsula, the west coast states were producing a fairly regular quantity of tin each year, a quantity which, though small as compared with the output of to-day, represented a considerable proportion of the world's supply at that time. The mining was carried on solely by Chinese immigrants whom the Malay rulers of the country treated with the contempt which good Moslems feel towards all unbelievers, and subjected to much extortion and ill-treatment. The retaliations of the Chinese upon their oppressors, and continual quarrels accompanied by open fighting amongst themselves, were the chief causes of British interference, and ultimate complete predominance, in what

are now the Federated Malay States. Under British protection and control, coupled with an ever-increasing demand for tin, the mining industry has grown rapidly and, while enabling many Chinese to amass large fortunes, has incidentally raised the states in a short space of time to phenomenal affluence. The revenue of the Federated Malay States on account of the tin-mining industry for the year 1910 was $7,000,000, or over £800,000, to which must be added some $3,000,000 on account of revenue on sales of opium, consumed almost entirely by tin miners.

Modern mining.

In the eastern and northern states of the peninsula tin mining has not been exploited to the same extent as on the west, by reason, chiefly, of the comparative absence of British influence and the strength of the Malay population and of Muhammadan prejudices which have discouraged Chinese immigration. Recent political changes are, however, already having effect, and it is possible that the small quantity of tin now produced may shortly be increased. Indications of the metal are not wanting and prospecting is proceeding steadily. A little tin has been mined in the island of Singapore, but the territories beyond the peninsula mainland do not appear to possess more than mere traces of it.

At Singapore and Penang there are extensive works where the tin ore from the mines in the peninsula is smelted prior to export, a scheme of American financiers to divert the ore to smelting works in the United States, and with it the practical control of the industry, having been frustrated a few years ago by the imposition of a heavy export duty on ore.

Character of mines.

About 170,000 Chinese are continuously employed in the tin mines of the Federated Malay States, forming a comparatively wealthy community, in the supplying of which with the necessities and pleasures of life about an equal number of their countrymen are engaged.

The tin occurs in the form of cassiterite, usually in alluvial deposits, but sometimes in lodes. The majority of mines are opencast, that is, are simple diggings in the surface from which the alluvial soil is removed until the

deposit of tin ore is laid bare below. Sometimes, however, the ore is still *in situ* in the granite, though the latter has become partially disintegrated and rotten. In such case the face of the granite is exposed and washed away by a stream of water assisted by the miner's pick. In places the stream of water assumes the form of a hydraulic jet.

Other minerals.

Wolfram, antimony, copper, galena, coal, and mineral oil are all known to occur in various parts of the territories under discussion, and to give promise of future development. Wolfram is mined with profit in the state of Kedah. Coal is fairly abundant in the island of Borneo and neighbouring territories, and has for some time been worked in Labuan, Sarawak, and Bruni. The Labuan coal-fields have been in the hands of various companies, the latest of which is apparently succeeding as it is exporting some 90,000 tons of coal per year. The Bruni fields are leased to Sarawak and are worked in conjunction with the Sarawak mines. The quantity of coal won varies, but averages show a generally upward tendency. The coal-fields of British North Borneo still await exploitation. Indications of coal occur in the Malay Peninsula, but have not hitherto been followed up with any success.

Oil.

Mineral oil has been known for a long time in Sarawak, but did not attract serious attention until about 1909, when a European company holding a liberal concession in the state carried out prospecting operations with highly promising results.

Guano and phosphates.

Guano and phosphates, though scarcely to be classed as minerals, may be considered here. In the state of Perlis, on the west coast of the peninsula, there are caves in which enormous quantities of the excrement of bats has accumulated in the course of many centuries. This is now being extracted, and some five thousand tons are exported annually. The demand is good, the quality of the guano being first-rate, and the amount worked will doubtless increase.

The phosphate deposits of Christmas Island have already been alluded to. These are of huge extent and

constitute in all probability one of the largest accumulations of this substance in the world. The company which holds the rights over the deposits exported in the year 1911 no less than 152,000 tons.

Manufactures and industries.

Apart from agriculture and mining the industries of British Malaya are not extensive. They may be roughly divided into two classes, (1) the manufacture of articles of personal wear and adornment and for household use, and (2) the collection and preparation for sale of natural products of the country. Almost all branches of the first class are declining, while those of the second class are increasing. In the days when foreign trade was in its infancy, the spinning and dyeing of cotton and silk and the weaving of cloth were the more or less continuous occupations of every woman; while the casting of brass pots, the manufacture of rough pottery, the weaving of basketry, the building of boats, and, last but by no means least, the making of weapons, kept a considerable section of the male population busy. All these industries continue at the present day, but the development of foreign trade has placed within the reach of the people the cotton cloth and ironware of England, India, and Austria, the coming of steamers has driven the larger boats out of business, and the establishment of the *pax Britannica* has reduced the demand for weapons. At present weaving persists chiefly for the purpose of making superior silk clothing for the better classes and has become more of an art than an industry, centring on Bruni and the peninsular east coast states; the making of brass and earthenware utensils continues only to a small degree, and that mostly in the more outlying parts where, from lack of communications, merchants of less transportable foreign goods have not yet penetrated. Boat-building is now confined to the construction of small fishing craft, and such weapons as are made are chiefly inferior articles produced for sale to tourists and curio hunters, even the rough iron knives, hoes, ploughshares, and other implements of woodcraft and agriculture being supplied from abroad to an ever-increasing extent. Every extension

of roadways in the recently acquired peninsular states, into the fastnesses of the Sarawak hinterland, or up the valleys and over the hills of British North Borneo, while opening up new lands for agriculture or mining, probably for the ultimate benefit of Chinese or other foreign immigrants, reduces the bulk of what may be called the home industries of the country, and, since the improvement of communications is necessarily the first policy of the government, it follows that before very long these industries will be little more than traditions. But as the native finds himself able to supply his wants by purchase and without the bother of making anything, he turns more and more towards the second class of industry, and in the collecting and preparing for market of the natural products of his country obtains with comparative ease and certainty the cash necessary for the satisfaction of his requirements.

Fisheries. Wherever the Malay lives within reach of the sea he is a sailor and a fisherman, even though incidentally he may be a rice-planter or an artisan. Consequently, along all the shores of British Malayan and Bornean territory fishing is actively carried on, and fish in some form or other, fresh, salted, or decayed, and either cooked or raw, is one of the principal articles of food of the people. The manner of fishing varies with the nature of the locality in which the operations are conducted. In the shallow and calm waters of the Straits of Malacca and round about Bruni and Labuan, the estuaries of the rivers, the mouths of the creeks and the channels between the islands where the tide waters scour in and out, are the favourite grounds, and in such places the fish are taken with combinations of stakes and nets in many forms. In the narrower creek-mouths bag-nets are fixed with a short palisade of stakes on either side, while in the broad estuaries the bag-net forms the apex of two long converging lines of stakes. The stakes intercept the fish hurrying out to sea on the falling tide. Elsewhere stakes planted far out from shore, but in shallow waters, are arranged as circular mazes with V-shaped entrances, in which the fish

collect, sometimes in enormous numbers, and whence they are taken with nets after the entrances have been stopped. These methods, when once the stakes are set, call for small exertion or enterprise on the part of the fisherman, but probably bring less profit than is secured by the far more exciting ways which are followed in other parts, as for instance on the east coast of the peninsula. Here the sea is deep close in to the shore, and the liability to rough weather at any season prevents the use of stakes and adds a spice of danger to the business. From out of every river-mouth and from each of a hundred and one villages on the beaches of this coast, there puts forth at break of day during the season when fishing is possible, a fleet of graceful sailing-boats of various shapes and sizes which, with broad sails set, glide out to sea until, hull down upon the horizon, they reach the fishing-grounds. Here seining or line-fishing occupies the time until, towards midday, the first puffs of the sea breeze give warning for the return. Then nets are packed, sails are hoisted, and, under a wind which freshens from minute to minute, the fleets race home, the pace increasing until the boats come rushing through the surf and into the river- or creek-mouths often at a good fifteen knots. The catch which, if good, is just as much as the boats can carry, is salted down roughly, and in this condition is bought by the Chinese merchants.

Copra.

The drying of coco-nuts into copra is a growing industry. The world's demand for copra is steadily increasing and appears likely to continue so to do for a very long time. British Malaya and British Borneo at present produce some 27,000 tons annually, some parts of the territories growing coco-nuts as fine as any in the world. The total area at present under coco-nuts is estimated at above 380,000 acres and is capable of great increase. The making of copra is one of those industries which by its simplicity and ease appeals strongly to the native of the tropical East. The operation consists in little more than opening the nut, leaving the kernel in the sun until dry, and packing the same in a sack. Thousands of tons of

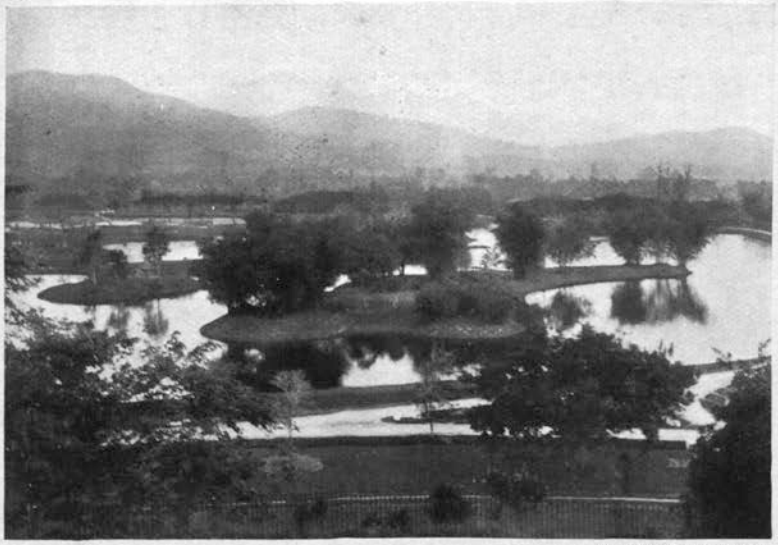
valuable coir (the outer husk of the coco-nut) are annually wasted in Malaya in copra making.

Artistic industries.

Though many lovers of the Malay have written much in praise of him as artist, apparently from a sense of duty or of loyalty to an ideal, yet it must be confessed that after all has been said the arts of British Borneo and Malaya are poor even when compared with those of neighbouring countries such as Siam, Burma, or Java. It is true that in the courts of the Malay Sultans many beautiful objects are to be seen; objects made long ago when a Malay nobleman could support, for next to nothing, a retinue of followers, including painters, silversmiths, and other artists, where time was of little value and the productions of foreign art had not yet seduced the native tastes. Amongst these are beautiful embroideries on silk, inlaid weapons with gold and silver sheaths, dishes, bowls, water-pots, betel-boxes, tobacco-boxes, pillow-ends, trays and other articles of gold, silver, alloyed gold and copper, and of 'Niello' or silver repoussé work inlaid with a black copper-sulphide and gilded. It seems probable, however, that many of these articles were not made by Malays, but were either brought from the Siamese country in the north of the peninsula, or were made by Siamese artists employed at the courts of the Sultans. The corresponding objects which are made now are not only very few, but will not bear comparison with their prototypes at all. As a painter the Malay is apparently hopeless, as a wood-carver he is distinctly bad, of the keramic art he is entirely ignorant, and in music his tastes are primitive and his execution poor. He has always tried to express his feelings in poetry, and his achievements in this direction are about equal to the results of his essays in silver-working.

Transport: shipping.

Fifty years ago British Borneo and Malaya possessed practically no land communications at all beyond rough pathways connecting villages in the more open valleys, or passing from hamlet to hamlet in the hill tracts. Almost all traffic and transport was carried on in boats, by sea or on the waters of the rivers near which the



Phot. C. W. Harrison.

PLATE XX (*a*). TAIPING LAKE, PERAK

Phot. J. B. Scrivenor.

PLATE XX (*b*). RAUB VILLAGE, PAHANG

(Mr. T. H. Reid, Malay States Information Agency)

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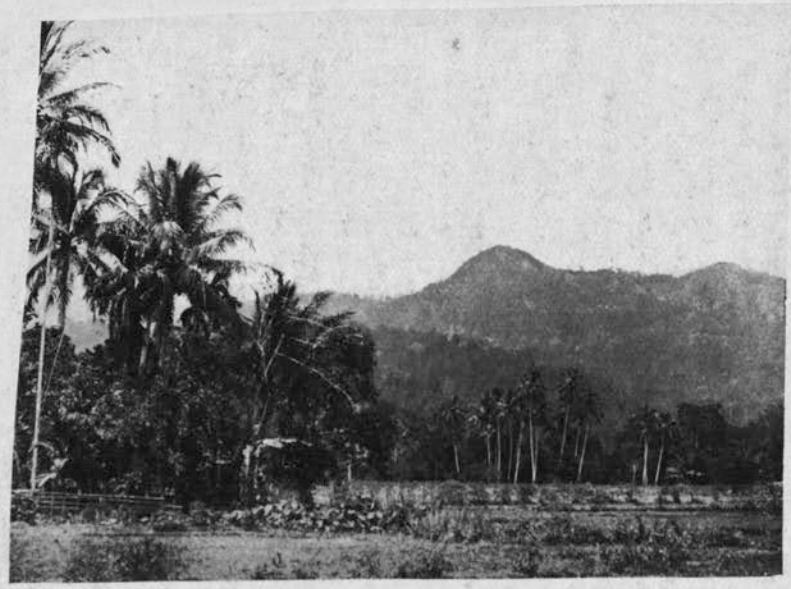

PLATE XXI. RICE-FIELDS AND COCO-NUT TREES, PAHANG

(Mr. T. H. Reid, Malay States Information Agency)

population usually settled. The Malays were justly famed for their skill in boat-building, and their vessels, whether sea-going ships, or boats and canoes for inland work, were, and still are, models of grace combined with utility. The position of Singapore as a port-of-call for practically all the shipping of the eastern world, and as an emporium of trade, long ago familiarized the Malays with steamships, but, until some fifteen or twenty years ago most of the commerce between Singapore and the other parts of the territories under review was carried in sailing ships, and it is only comparatively recently that the trade with the coast ports of the peninsula and with British North Borneo and Sarawak has been served by regular and frequent steam traffic. But though of recent introduction, the small coasting steamers have already practically swept the seas of the old sailing craft. A few vessels persist here and there, especially between Penang and the Kedah coast, but most of the graceful schooners and heavy lorchas which once thronged the harbours of the Straits Settlements now lie, abandoned hulks, on the sands or mud of their native rivers, their day over and their occupation quite gone. Meanwhile, steam transport has greatly developed trade and is constantly increasing to keep pace with that development. Several companies having their head-quarters at Singapore, Bangkok, and Penang are engaged almost solely in the coast trade; their vessels are specially built for the business and are fitted with all the latest conveniences, and the notorious 'mosquito fleets' of Singapore and Penang, erstwhile consisting of a heterogeneous collection of superannuated steam yachts and worn-out tramps of the smaller size, have now grown beyond recognition in number and appearance and represent the profitable investment of considerable capital.

Roads.

After the British intervention, the western states of the peninsula were rapidly opened up by roads, means of communication better than the existing water-ways being found immediately necessary both for strategic reasons and to render the tin-bearing lands accessible.

Construction was steadily pursued and in course of time was extended, though in a less degree, to the eastern state of Pahang. At the end of 1911 there were just on 2,000 miles of first-class metalled road open in the four federated states, and there is not the least doubt but that these roads have been largely instrumental in the growth of the states from poverty to wealth. At the same time the advantages of railway communication have not been overlooked. In 1896, some twenty years after the British intervention in the peninsula, 150 miles of railways were open for traffic, and in 1911 the mileage had increased to about 550, not including a line through the whole length of Johor connecting the Federated Malay States with Singapore, the whole system bringing in a net annual revenue of some $2,500,000 (£300,000). The above roads and railways were paid for out of the stupendous revenue derived from the tin-mining industry and from opium, the railways representing an investment of over $62,000,000. The entire system is admirably managed and maintained, and an extensive motor-car service is conducted on the roads in connexion with it.

Railways.

In the Straits Settlements Colony there is not much room for extension of land communications, but all the settlements have been provided with as many good roads as are necessary, and Singapore Island, Province Wellesley, and Malacca are traversed by lines of railway connecting with the Federated Malay States system. In Singapore and Penang towns there are wide-extending electric tramway systems.

When the northern states of the peninsula came under British protection, not much had been done there in the way of road-making owing to lack of funds, but since that time money has been lent to the states by their wealthy neighbours of the Federation, and road-making is being pushed on as quickly as may be. Moreover, railway surveys have been made in Kedah, and a line is in course of construction in Kelantan which will ultimately be linked with the Federated States system and with the State Railways of Siam to the northward.

The Borneo territories under British sway are far behind the peninsula in the matter of communications. There are practically no roads either in Sarawak or in British North Borneo. The latter, however, has a railway on the east coast about 100 miles long, but it is of faulty construction and doubtful utility. Lack of funds is probably the chief cause which has prevented the development of means of transportation in British North Borneo.

In Sarawak it seems possible that the comparative absence of communications may be intentional, for roads and railways and their attendant development, while certainly adding to the wealth of the Raja and his Government, would also bring the natives into sharp competition with foreigners, to the sure undoing of the former, and it appears that the policy of Sarawak has hitherto been to preserve the state primarily for the uses of its own proper inhabitants rather than to exploit it in the interests of foreigners, a policy somewhat different from that which has prevailed in the Federated States.

Commerce.

The commercial history of the ports of the Straits Settlements has been remarkable. In the sixteenth and seventeenth and part of the eighteenth centuries Malacca was the chief centre of European trade with the Far East, at first in the hands of the Portuguese and afterwards under the Dutch, until the partial silting up of its approaches and the creation of the port of Penang by the British robbed it of its importance. But neither Malacca nor Penang was so well situated for purposes of ocean trade as the town of Singapore, which, after the occupation of the island by the British in the beginning of the nineteenth century, grew with extraordinary rapidity and soon eclipsed both the former.

Singapore.

Singapore town, which in 1820 was a tiny settlement of Malay fishermen, at the end of that century had become, judged by the amount of its shipping, one of the first ports of the world, and though attempts have recently been made by both the Dutch and French to establish rival harbours in the neighbourhood, it is still steadily growing. Its situation

at a southern extremity of the continent of Asia and its admirable harbour and roads make it the inevitable place of call for the ships of all nations passing between India or Europe and the Far East, while its central position as regards the fertile regions of Farther India and the Malay Archipelago make it the natural centre for the collection of produce and the distribution of European commerce for those regions. In a single year the number of merchant vessels entering and clearing the port exceeds 11,000, with a tonnage of some 15,000,000. Penang, though long ago outstripped by Singapore, is still in active and rather noisy competition and has a good business, which with the development of the neighbouring Malay States has grown steadily and will continue to do so. A few years ago Malacca was considered to have quite closed its honourable career as a port, but the linking of the town by railway with the states of the hinterland and the development of the rubber-planting industry in the immediate vicinity of the town gave it, about 1909, a new lease of life and galvanized its long-deserted quays and dilapidated warehouses into an appearance of activity, though, owing to the natural defects of its position, it can never again offer serious rivalry to its neighbours. At present the ports of Penang and Malacca with Labuan and Christmas Island, the last two included for convenience in the administration of the colony, have a total annual shipping of over 8,000 ships entered and cleared, with tonnage of some 8,500,000. Thus the whole colony of the Straits Settlements has a shipping of about 24,000,000 tons, and this is exclusive of the number of native craft, which, though nothing to what it once was, is still considerable. With the expropriation by Government of the Tanjong Pagar Dock Company at Singapore in 1905, all the docks and wharves of the colony came into Government hands, and many millions sterling have been spent on improvements to these; the harbour accommodation, at Singapore especially, having been materially increased.

Penang and Malacca.

Imports and exports.

Owing to the fact that the colony is simply a receiving

and distributing channel, almost all goods appear both as imports and exports. Most of the inhabitants who are not engaged in the coaling, victualling, or refitting of ships, or in transhipping cargo, find their occupation in one or other of the many operations connected with the collection of tin, rubber, gutta-percha, copra, and other local produce for shipment to Europe or America, and in purveying cloth, rice, hardware, cutlery, paper, liquors, tobacco, wheat, flour, oil, matches, &c., in exchange for the same.

Formerly all the trade of the Federated Malay States passed through the colony, but the development of rubber-planting brought about direct communication with the United Kingdom and Europe, and 224 ocean-going steamers entered the little port of Port Swettenham in the state of Selangor during the year 1910. The total trade of the federated states amounted in that year to about £6,000,000 sterling imports, and about £12,000,000 exports, practically the whole of which was with the United Kingdom or British possessions, though much of that sent through Singapore and Penang was doubtless transhipped thence to foreign countries. The chief articles of export are tin, rubber, copra, tapioca, sugar, and rice. Rubber increased enormously during the five years ending 1910, and copra also came up. Tapioca and sugar, on the other hand, decreased. Tin decreased slightly.

The trade of the non-federated states of the peninsula increased rapidly in Johor after the railway was completed, and in the northern states after the establishment of British protection there. The chief exports from Kelantan are copra, cattle, and betel-nut, and the principal imports cotton goods, kerosene oil, and silk. From Kedah the chief exports are rice and paddi; from Tringganu they are dried fish, tin ore, and copra; and from Johor gambir and pepper.

The trade of the Bornese territories is discussed in the following chapter. The island of Labuan has a magnificent natural harbour, and once upon a time it was thought

that the settlement might grow into a great emporium possibly outrivalling Singapore. Such, however, has not been the case, though the place acts as a distributing centre for parts of the adjacent mainland.

Population and Government

Origin and extension of Straits government.

The extension of the authority of the Government of the Straits Settlements Colony to the surrounding territories and the gradual formation of the not unimportant part of the British Empire which centres round Singapore has already been alluded to. A complete history of that extension and growth, and the devious ways by which they have been brought about, would make a fascinating tale and a long one. It would show how by conquest, settlement, purchase, barter, and gift, the flag has been pushed forward by fixed and steady endeavour or by spasmodic and accidental jerks, from the moment when it was hoisted on the island of Penang (ceded by the Sultan of Kedah to the Honourable East India Company in 1786), to the landing of the newly-appointed British Agent on the shores of Tringganu in 1909. It would show poor Francis Light, who hoisted that flag on Penang, wasting his life in vain efforts to persuade the East India Company to redeem the pledges given on obtaining the island. It would show the Honourable East India Company sending 12,000 soldiers to conquer Java, and, after the island had been wrested from the Dutch at great cost of lives and treasure, handing it back to them (1816). It would reveal the adventurer J. Ross, a skipper in the British service of Java, sailing away after the surrender of that place to found the colony of the Keeling Islands (1819), where his grandson rules to-day. It would tell of Stamford Raffles, fighting his masters, the Honourable East India Company, almost as strenuously as his enemies the Dutch in his struggle to secure supremacy in these Eastern seas, and dying broken and disgraced (1823), but with the satisfaction of having forced upon his unwilling country Singapore with its future of marvellous

prosperity and wealth, now regarded by that country with so much complacent pride.

Finally, it would show how from the most altruistic motives, but with egregious blundering, the British Government reluctantly undertook protection of the Malay sultans of the peninsula and their people (1873), and thereby entered upon a course which has led, and is still leading, by a quite inevitable chain of events, to the partial supplanting of the indigenous population by foreigners and to the elimination of all but the semblance of the sultan's authority; and in showing this last it would explain many peculiarities of the actual situation with regard to these states.

Nationalities and peoples

It will be expected that the population of possessions acquired by such peculiar methods and at such different times will be mixed, and such is, in fact, the case. The total population of the territories in 1911 approached 3,500,000, and included, besides Malays and aboriginal tribes, Europeans, Chinese, Punjabis, Madrassis, Sinhalese, Arabs, Turks, Siamese, Japanese, Burmese, Javanese, Annamese, Kambodians, and others. Moreover, the Chinese were divided into some eight different classes, which are almost distinct races, and the Europeans included persons of many nationalities, especially German and Dutch, in addition to the British.

Chinese.

The Chinese number over 1,000,000 and are most numerous in the towns of the Straits Settlements Colony, where they are engaged in every kind of occupation. They seem at first glance to form almost the sole population of Singapore, for by their prominence there they eclipse the inhabitants of all other Eastern races. All the trades, and nearly all the retail commerce, are in their hands. They clean the drains and pull the rickshaws; street after street consists of nothing but their shops; they swarm in the mercantile offices in every capacity, and many of them achieve wealth and live in luxury.

In the Federated States they are chiefly miners, but, since 1911, considerable numbers have found employment there as coolies on rubber plantations. In the protected

states of the peninsula they overran Johor long ago, but did not receive much encouragement elsewhere until after 1909, when the establishment of British suzerainty opened the other states to their enterprise.

In the Borneo territories they are fairly numerous. Although once long ago they rose and nearly deprived the Raja of Sarawak of his country, they are now encouraged there within certain limitations, while the Government of British North Borneo opened official negotiations with China in 1913 for the regular importation of agricultural labourers in large numbers.

Indians. Of natives of India, who number about 330,000, the Madras Tamils resort mostly to the Federated States for employment on the plantations, though there are many of these located in Penang also, where they compete with the Chinese in various departments of manual labour. Punjabi clothsellers infest the bazaars of all the towns and penetrate with their pedlars' packs into the remotest parts of the interior, where they cheerfully incur considerable risk to life and property for the sake of the large profits they make on their goods.

Europeans and Eurasians. The European population may be divided into three parts, namely, officials, planters, and merchants. The officials are of course all British, the planters are nearly all so, but the merchant is a German almost as often as anything else. There is a considerable Eurasian element in the older settlements, composed of the descendants of the European settlers who have married native women. The best families of these are Portuguese, and many of them are old-established and some are wealthy.

Distribution of Malays. The distribution of the Malay part of the population is somewhat remarkable. They form what may be called the indigenous population of the land, that is, they are the people who owned it, ruled it, and formed the majority of the inhabitants at the time when it first became know to Europeans. At that time their greatest numbers were round about Malacca, but after this was taken, they dispersed to other parts of the peninsula, gradually forming the other states, into which the population with-

drew before the advance of the white man. They seem to have preferred consistently the benighted rule of their own princes to the blessings of government by European methods, for when in 1909 the last remaining states fell under British control, it was found that the Malay population of these was 45 to the square mile, as against 20 to the square mile in the Colony and the Federated States combined. The Malay is by nature unable to take advantage of the development which foreign rule is thrusting upon his country, and, though his numbers may not actually diminish, he seems bound ultimately to be swallowed up and lost amidst the crowd of foreigners hastening to secure the wealth which such development produces.

Ethnology of the peninsula.

In the Malay peninsula there are several tribes of very ancient location and peculiar aspect, who are generally classed together as aborigines, and who, until about the beginning of the twentieth century, were generically known as Sakai. Investigation on scientific lines has, however, shown that these tribes are not of common origin, and that while the Sakai proper are probably Dravidians from India, the other tribes, known as Pangan, Jakun, Semang, are apparently of Negrito stock and much older. The Pangan and their cousins are of almost pigmy smallness, have wool instead of hair, a very dark colour, and a distinctly negroid cast of countenance. The Sakai has curly hair, not wool, is of a paler complexion, and several sizes larger. However, the tribes all inhabit the mountains together, and have intermarried so much as to have got their distinctive characteristics a good deal mixed. They are quite uncivilized, wearing no clothes, building no houses, planting no crops, possessing scarcely any religion, and only the rudiments of a language, with nothing in the shape of written character. They are very few in number and are not increasing. In fact, from any point of view other than the ethnological, they are of practically no importance at all.

These ancient tribes, who may have inhabited the greater part of the peninsula at one time, were apparently

displaced gradually and driven into the hills by intruding members of the great Mon Annam family, which seems to have flooded the whole of the Indo-Chinese peninsula at a very ancient date, and to have overflowed into the islands around and to the south of it, their descendants constituting the population of what is now called the Malay peninsula at the time when the Malays themselves set foot upon it. Though related to the Mons (or Talaings) of Burma and the Kambodians, these tribes must have been quite without civilization or culture, for there are practically no records or relics of their original condition. In all probability they closely resembled the Lawa and other hill-tribes of Indo-China, also of Mon Annam stock, who at the present day are in a most primitive condition.

In the island of Borneo the Negrito and Dravidian 'aborigines' are not found and possibly have never existed. The most ancient inhabitants of this part are the Muruts, Kayans, Dayaks, &c. (for which see Chapter XIII).

Characteristics of Malays.

The Malays are distinctly a race of comparatively modern evolution. It seems probable that at the time of their first incursions into the peninsula from oversea, they were hardly distinguishable from the tribes of Mon Annam descent whom they found there. Indeed, it is considered by some that they were themselves tribes of Mon Annam descent, whose religion, speech, and even personal appearance, had undergone slight modifications by contact with Dravidians from the continent of India, and that the tribes they attacked and afterwards proselytized were their not very remote cousins. The present-day conception of a Malay is a brown man of Mongoloid features, Muhammadan religion, and using the Malay language, but it must be remembered that his alphabet and his literature are both (to him) modern; that his language is largely made up of foreign words introduced not very long ago; that his religion is little more than a recently applied veneer of Muhammadanism, overlaying a rampant Animism; and that his physical appearance follows no distinct type, but varies according to the

particular locality from which he hails. Those who maintain the theory of a Mon Annam ancestry for the Malays, consider that they were at first merely one or more of the Indonesian tribes, which, raised by chance association with Brahman foreigners to a slightly higher level than the others, made themselves paramount amongst them. They also suppose that the Malays themselves, having entered the fold of Islam, imposed their new-found religion upon such other tribes as they were able to subdue, converting whole populations, by the simple processes of circumcising the males and marrying the females, into very passable Malays. There appears to be some ground for this theory in the fact that, though when the Malays invaded Kelantan some 400 years ago they found a large infidel population, there are now no infidels in that state, while nobody who has seen both could for a moment suppose that the typical Kelantan Malay of to-day has the same ancestry as the typical Malay of, say, Sumatra.

Mixed population of Straits Settlements.

With the exception of Malacca and Province Wellesley, the population of the Straits Settlements has been built up since, and in consequence of, the British occupation, and it is more mixed than that of any other British colony and possibly than any other community whatever.

Englishmen, Hindus, and Madrassis came in the wake of the Honourable East India Company as civil officials, soldiers, and merchants; some Malays came into the new settlements from the surrounding lands; the Chinese early discovered the value of the settlements for purposes of trade; and Sinhalese, Northern Indians, Bengalis, and Burmese in time found their way there also.

The Chinese element largely predominates in the towns, and, by their intermarriage with Malay women, a half-breed race, known as Straits-born Chinese or 'Baba', has been evolved, the members of which speak Malay and English, but not often Chinese, are well educated, industrious, and ultra-patriotic British subjects.

Government.

The first governors of the Straits Settlements were officers of the Honourable East India Company's service,

and the territories then formed a presidency of British India. Later on, for convenience of administration, the Settlements were attached to the Presidency of Bengal, but, this arrangement being found not altogether successful, the separate presidency was resuscitated. About 1857, however, an agitation was started with the object of securing complete separation from India, and, after a discussion which extended over some ten years, this was successful, the Settlements being constituted a Crown Colony in 1867, in which condition they still continue. The governor rules with the aid of a large staff of officials and of a legislative council composed of officials and private individuals (the former always in the majority), all appointed by nomination. The chief assistant to the governor in Singapore is the colonial secretary, while in Penang and Malacca he is represented by officers styled resident councillors.

Justice. Justice is administered in criminal and civil courts situated in each settlement, with a high court at Singapore. The police is officered by Europeans, and contains European, Punjabi, Malay, and Chinese constables in its ranks.

Defence. Singapore is strongly fortified, and the military garrison consists of two regiments of infantry, a battery of artillery, a company of Royal Engineers, and the necessary service corps. There is also a strong body of volunteers. Singapore possesses a naval dock in which the largest ships can be repaired.

Federated States. The four states of Perak, Selangor, Negri Sembilan, and Pahang have each a Malay chief as their nominal ruler. At different times during the last century the British Government of the Straits Settlements intervened in the affairs of these states and caused their rulers to make treaties, admitting British officers to their councils as agents of the Governor of Singapore. Thereafter, by a seemingly inevitable sequence of events, the centre of power passed gradually from the hands of the chiefs into those of their British advisers, until after the culminating move which brought about a close inter-state federation in 1906, the states became, to all intents and purposes,

four provinces of a territory governed entirely by British officers under the high commissionership of the Governor of Singapore, the Malay chiefs being retained merely as order-bespangled pensioners. In most aspects the administration has been a signal success. With the assistance of a comparatively small number of British officers, one battalion of Sikh military police, and a small civil police force, law and order has been well maintained. The country has been opened up by roads and railways, and every facility has been afforded to foreigners of all descriptions to come and assist the work of development. Populous towns have sprung up at the mining and planting centres. Moreover, a large surplus of revenue has accumulated which the authorities have not scrupled to use for such purposes as making foreign loans, assisting the finances of the neighbouring colony, and even providing ships for the British Navy.

Non-federated States.

In the Malay states outside the federation the British agents of the governor have not advanced beyond the stage of 'Adviser', and the Malay rulers still, to some extent, influence the administration of their territories. The forces are at work, however; British officials are gradually replacing natives, roads and railways are under construction, foreigners are flocking in, and, since British influence became paramount in 1909, so much progress has been made as to warrant the assumption that at no far-distant date these states will have reached conditions of prosperity, and their rulers degrees of nonentity, equal to those of their federated neighbours.

The administration of the other territories is considered in the two following chapters.

Currency.

Throughout the various territories and states under consideration a coin known as the Straits Settlements dollar is in circulation and is the standard coin. It is divided into a hundred cents, and the Straits Settlements subsidiary silver 50 cent, 20 cent, 10 cent, and 5 cent pieces are also current in most parts, though not in all. The 50 cent piece is not common anywhere.

At the beginning of the present century the unit of

currency in the colony was the British dollar, the Mexican silver dollar being of equal value and also current. At the same time in the more outlying territories the old Spanish dollar, once so common all over the East, was the coin most usually met with. The value of all these coins fluctuated with that of silver, which at the end of the nineteenth century was so unstable as seriously to hamper the trade of the territories. The Straits Government therefore took up the question of currency, and a commission appointed to go into the matter reported in favour of a new coinage of fixed value. Thereupon the Straits Settlements dollar was introduced, and its value was fixed by law at two shillings and fourpence. The Mexican dollar, the British dollar, and an abortive first attempt at a Straits dollar which had been put into circulation, were demonetized, the old Spanish dollars fell into disrepute even in the remotest districts, and gradually the new coin became current throughout the territories.

Formerly most of the states coined their own subsidiary money, the metal usually employed being either tin or tin and lead mixed. Such coins were of various shapes and values and were current only in the districts where they were made. In 1912 a few were still in use in the recently acquired territories, but were fast disappearing before the silver and copper small coin of the colony.

Literature. See official annual *Reports* and *Manual of Statistics*, also *General Information for intending Settlers* (Federated Malay States), issued by the Emigrants' Information Office, London; Sir H. Clifford, *Further India*, London, 1904, and other works; W. W. Skeat, *Tribes of the Malay Peninsula*, London, 1904, and other works; Sir F. A. Swettenham, *British Malaya*, London, 1906, and other works; H. C. Belfield, *Handbook of the Federated Malay States*, London, 1907; W. A. Graham, *Kelantan*, Glasgow, 1908; C. W. Harrison, *Illustrated Guide to the Federated Malay States*, London, 1910; A. Wright and T. H. Reid, *The Malay Peninsula*, London, 1912.

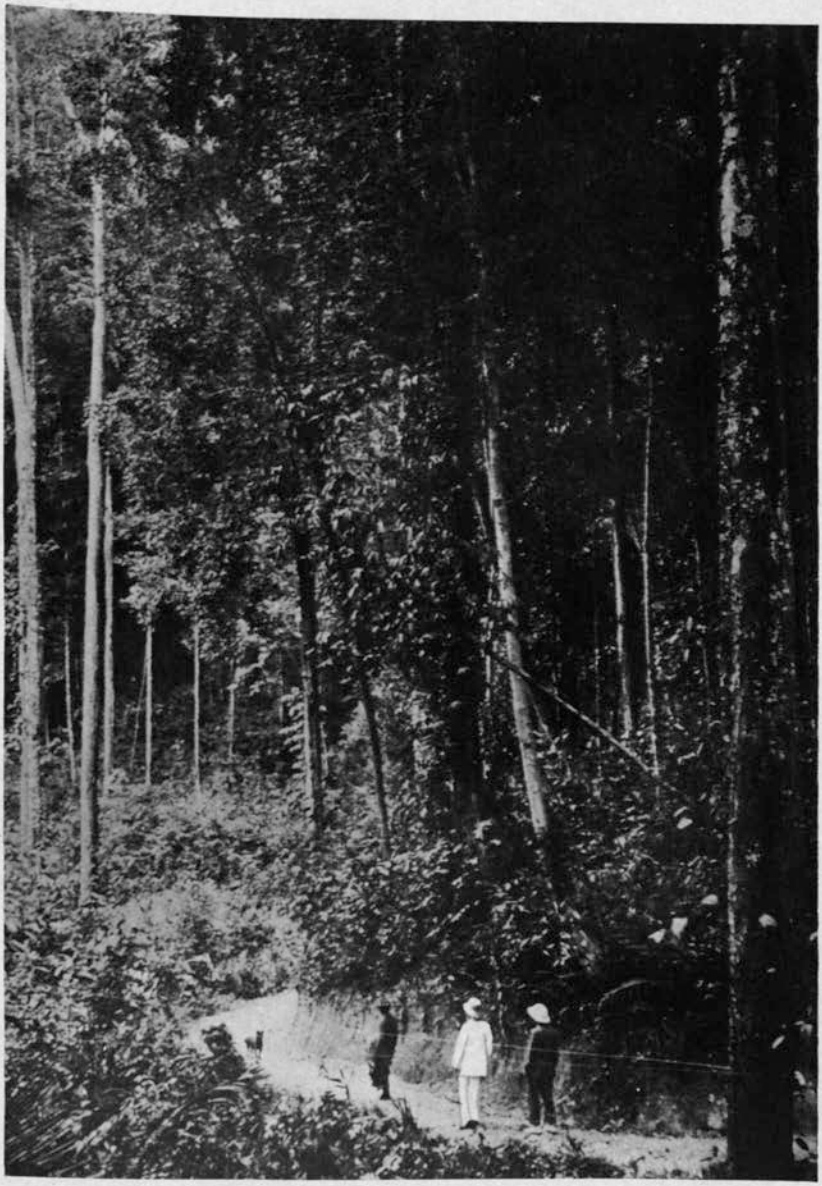

PLATE XXII. A JUNGLE SCENE IN THE MALAY PENINSULA
(Mr. T. H. Reid, Malay States Information Agency)

PLATE XXIII. A RIVER SCENE IN THE MALAY PENINSULA

(Mr. T. H. Reid, Malay States Information Agency)

CHAPTER XIII

BRITISH BORNEO

By William McDougall

Physical and political geography.

Borneo, largest but one of the islands of the world, has an area of nearly 300,000 square miles. It is 830 miles in length from north to south and 600 in breadth from east to west. Its centre lies about 50 miles north of the equator in longitude 114° E. of Greenwich. Unlike most of the islands of the Malayan Archipelago, which are of volcanic structure and origin, it is composed of a central mass of granite and ancient sedimentary rocks surrounded by a belt of alluvial plains formed by the detritus washed down by the many rivers which flow from the central highlands. The more ancient geological formations occur in the northern part of the island, where the sedimentary rocks, limestones, schists, slates, and sandstones, are of the Primary period. In the southern half of the island occur strata of the Secondary and Tertiary periods interspersed with some volcanic deposits. The mountains, which rise at many points to heights of approximately 8,000 feet, are disposed in two principal chains, one of which crosses the middle of the island from east to west, while the other crosses it obliquely from north-east to south-west. These ridges divide the main part of the island into four great watersheds, of which the north-eastern, the south-eastern and south-western constitute Dutch Borneo; while the north-western is the territory of Sarawak. There are also several outstanding mountains of considerable height, such as Mount Muka, a mass of limestone which rises to a height of 9,000 feet in the north of Sarawak. The north-eastern end of the island consists of an isolated mass of granite—Mount Kinabalu, the highest peak (14,000 feet), with its surrounding foothills and alluvial zone; it constitutes the territory of the British North Borneo Company (31,000 square miles).

Within the northern end of Sarawak lies a small triangular area (about 4,000 square miles), having for a base the coast-line from a point 3 miles north of the mouth of the Baram to the mouth of the Timbang River ; this is all that remains of the Malay Sultanate of Bruni. This remnant, which contains the town of Bruni, the ancient capital of the sultans, is now under the protection of the British Crown, and as Sarawak also is a British protectorate, the whole island is divided between the Dutch and British ; the three British divisions forming a continuous territory, which comprises about one-third of the whole island and all the northern and north-western parts of the coast.

The line which divides British from Dutch territory follows the water-parting formed by the mountain ranges. It runs from Cape Datu a little south of the middle of the west coast, following the ridge of the Kapuas mountains eastward, to Mount Tamaru, a peak near the centre of the island ; then proceeds north-east along the ridge of the Iran mountain chain, and from the point where this ridge terminates in lat. 4° N. it runs eastwards to the coast.

Climate. The physical conditions and climate are closely uniform throughout the island, being varied only by the moderate elevation of the central highlands and mountains. The rainfall is copious (compare preceding chapter) ; in the British territory the greater part falls during the prevalence of the north-west monsoon from October to March. In the low-lying coastal regions the temperature commonly ranges from 70° to 90° F., and seldom rises as high as 100°. In the central highlands the temperature ranges rather lower, but even on the summits of the mountains frost is unknown, and the summit of Mount Kinabalu is but rarely sprinkled with snow. Though the climate of the low-lying regions is enervating to Europeans, it compares well with many other moist tropical regions, inasmuch as the fevers seldom prove fatal to Europeans. With the exception of the relatively small areas cleared for cultivation, the whole island is clothed with dense

forest from the sea-shore to the summits of the mountains.

Rivers.

The rivers are large and numerous. The largest in British territory is the Rejang, which runs westward across the southern part of Sarawak and is navigable by small steamers some 160 miles above its mouth. Other rivers of Sarawak, notably the Baram, the Batang Lupar, and the Timbang, are navigable for considerable distances; but those of British North Borneo, owing to the proximity to the coast of Mount Kinabalu, are smaller. The Kina Batanga, which opens on the east coast at Sandakan, is the only one large enough to provide a useful waterway to the interior.

Vegetation.

The soil of Borneo, in comparison with that of some of the volcanic islands, such as Java, is poor; but the vegetation is nevertheless very luxurious and rich in species. The forests in the greater part of the territory are composed of very large trees (many ranging between 100 and 200 feet in height) with a dense undergrowth of palms, ferns, and creepers of many kinds. The coastal regions, being in many parts swampy, bear a variety of trees peculiar to such a habitat, notably the mangrove and the nipa palm. On the summits of the mountains the forest trees are of lower growth and are clothed in a thick layer of moss. Many of the plants of the jungle are of economic importance; notably, many varieties of fine timber trees, especially several ironwood varieties; rubber trees and creepers, the rattan creeper, the camphor tree, and the sago-palm. Borneo is one of the regions most favoured by the orchid hunter, a large number of striking species having been found in the island.

Fauna.

The fauna is rich, more especially in birds, of which many species are peculiar to the island. Among the most characteristic birds are several species of hornbill, the argus and Bulwer's pheasant, many eagles and hawks, trogans, spider-hunters and broad-bills. Of mammals, the elephant occurs only in the extreme north, and was probably introduced from India. Of indigenous mammals a small species of rhinoceros is the largest. Wild cattle

are found in the remotest parts of the jungle and wild buffalo in some of the coast regions. Deer of several species—the small sambur (*Cervus equinus*), the muntjac (*Cervulus*), the mouse-deer (*Tragulus*)—and wild pig abound. The tiger-cat (*Felis nebulosa*) is the largest of the carnivores, of which there are several smaller species. The island has the distinction of being the home of two species of quadrumanous apes, the *maias* (popularly called the *orang outan*) and the gibbon, both of which occur in British Borneo, besides several species of monkeys, of which the long-nosed monkey (*Nasalis larvatus*) is peculiar to the island. Snakes of many kinds abound, some being very venomous; the python attains a length of 30 feet.

The fauna of Borneo is distinctly Asian, and points to a connexion of Borneo with the mainland during the later part of the tertiary geological epoch; a fact which must be associated with the position of Borneo within Wallace's line upon a great submarine bank which juts out from the south-eastern corner of Asia at a depth everywhere less than 100 fathoms. A point of peculiar interest is that on the mountains of Sarawak and on Mount Kinabalu above the level of 4,000 feet, a fauna has been found which is very closely allied to that found at a slightly higher level in the Himalayas and in the mountains of the Malay Peninsula, some of the species peculiar to these three habitats being identical. A similar fauna has been found in the higher parts of Java during the early years of this century.

Social and Political Conditions

Native population.

The indigenous population of British Borneo, like that of the rest of the island, consists of various tribes of Malayan and Indonesian stocks, and numbers probably between two and three millions in the whole island. The people are of rather short stature, but well built and active. The colour of the skin ranges from a medium brown (in the Ibans) to a very pale *café-au-lait* or greenish

yellow. The hair is dark brown, long and nearly straight to wavy. The face has but little hair and shows traces in many individuals of the Mongolian characteristics, while in others the features are almost purely Caucasian.

Habitations and customs.

By far the greater part of this population lives in small villages widely scattered on the banks of the rivers, and enjoys a type of culture which at its best may be characterized as of the middle barbaric level. This is displayed in its best form by the Kayans and Kenyahs who dwell on the upper waters of the Baram and Rejang rivers. Other tribes participate in this type of culture in various degrees. Each village consists of one long house or more, standing upon the bank of a river. Each house accommodates in a series of chambers some fifty to a hundred families; and these use in common the long verandah which runs the whole length of the front or river side of the house. The floor is raised some 20 to 30 feet above the ground on stout piles of ironwood, and the roof, a single long gable, is stoutly made of well-fitted beams and rafters and covered with slats or shingles of ironwood. The only domestic animals are the pig, fowl, dog, and goat.

Occupations.

The people of each village cultivate patches of land in the neighbourhood of the village, clearing away the forest by felling and burning the timber. The principal crop raised is *padi* or rice. The methods of farming are very simple; the grain being merely dibbled into the ash-covered earth, without further preparation. The skill in working timber, which is so effective in the construction of the long houses, is displayed also in the hollowing and shaping of canoes (the largest of which will carry a crew of 100 or more warriors), and in the making of many smaller articles, such as shields, dishes, and above all the blow-pipe from which a poisoned dart is expelled. This instrument, which is chiefly used in hunting small game, is bored from a single staff of hard wood and finished with great nicety. The people are skilful ironworkers, smelting a native stream ore, and working peculiarly shaped sword-blades, knives, and spear-heads. They are expert in the

weaving of baskets and mats of many kinds; and in fine lashing with rattan strips. They prepare a tough cloth from the bark of trees; and this (though now largely superseded by imported cloth) is worn by the men as a waistcloth, by the women as a skirt or apron, hanging from the hips nearly to the ankle, but open at one side.

Decorative designs of considerable variety and beauty are freely applied in almost all forms of handiwork, especially in wood-carving, bamboo-work, basket- and mat-weaving, in painting, in beadwork, and in tattoo; which last is practised in various degrees by most of the tribes.

Warfare between tribe and tribe and between village and village has been very rife; but is now almost completely suppressed by the British administrations. A prominent feature of it, and in part the cause, was the taking of heads of slain enemies. These heads are dried and smoked and hung above the principal hearth in the long house, and are made the object of a cult which expresses awe rather than exultation over the conquered foe.

Religion. The religion of the pagan tribes is a polytheism which in many features strikingly resembles that of classical antiquity in Europe, especially in respect of the reading of omens and the answers to prayers in the flight and cries of birds and in the entrails of beasts. They believe also that they are surrounded by a multitude of less clearly defined spiritual powers that may affect their lives in many ways for good or evil, but chiefly the latter; and their freedom of action is accordingly restricted by a multitude of tabus. They believe in a life after death under conditions very similar to those of their present life; and their belief shows rudiments of the principle of retribution. Their moral code and customs are in the main of a high level, and are strictly observed; their manners are good, especially in the chiefly class. Three social classes may be easily distinguished; namely, an upper class consisting of the chief of the village and his relatives, a middle class of free men, and a lower class of slaves and freed men. Monogamy is the rule, though

a second wife is permissible under approved conditions. Burial takes place in coffins of wood or earthenware jars, raised high above the ground on massive boles of timber, which in the case of chiefs and their relatives are generally decorated with elaborate carvings.

Ethnology.

The characteristic culture briefly outlined above is found in its highest development among the warlike Kayans, who occupy the upper waters of the Rejang and Baram Rivers of Sarawak. There are many reasons for believing that it was introduced to Borneo by the Kayans some centuries ago, when in all probability they migrated from the basin of the Irawadi, entering Borneo on the south coast and pushing up the great rivers to the central highlands. The other tribes, which display this culture in less complete degrees, have probably acquired it through contact with the Kayans. The interior population of British North Borneo belongs mainly to the tribe of Muruts and the two smaller tribes closely akin to them, the Kalabits and the Dusuns. It seems probable that the Muruts represent a blend between the indigenous stock and immigrants from the Philippine islands or Annam. They differ appreciably from the tribes of the rest of the interior of Borneo in physical type and in culture. There remain scattered communities of nomads who neither build houses nor cultivate the land; and their very primitive culture probably represents a survival of the culture common to all the population of the interior prior to the advent of the Kayans. In the south of Sarawak a large part of the population consists of Ibans or Sea Dayaks, who owing to their co-operation with piratical Malays in the middle of the nineteenth century, and to their taming by Rajah Sir James Brooke, have become better known to Europeans than any other of the tribes. They seem to be of Malayan or Proto-Malayan stock, and to represent a comparatively recent immigration from Sumatra or the adjacent lands from which the Malay dispersion took place. In the north of Sarawak and in North Borneo, long-continued contact with the Chinese and with inhabitants of the Philippine and Sulu Islands

has rendered the population more heterogeneous both in blood and in customs. The cultivation of *padi* in swampy land by the aid of buffalo and rude ploughs, and the building of villages in other positions than on the river banks, and the consequent lack of boats: these are the principal points in which their mode of life differs from that of the tribes of the rest of the interior. Besides these pagan tribes, there dwells on the coasts and the lower reaches of the rivers a considerable population which has assimilated in various degrees the religion and culture of the Muhammadan Malays, who since the fifteenth century have occupied small towns and villages upon the coasts and have pretended to a tyrannous lordship over the pagan tribes. These converts to Islam call themselves Malays, and adopt in the main the Malay culture and mode of life in small separate houses, grouped in villages and often built over the water of the rivers or estuaries. But among the more recent converts various stages of transition and of blending of the two cultures may be observed.

For many centuries there have been settlements of Chinese in north-west Borneo, occupied in working alluvial gold, in the cultivation of pepper, and in petty trading. And under the British administrations these settlements have prospered and multiplied largely.

Native government and European relations.

When Europeans first visited the coasts of Borneo, they found Malay sultans established at several points who claimed to divide between them the suzerainty over the whole island. Of these the Sultan of Bruni was one of the most powerful. His nominal rule extended over most of the territory that is now British, though the Sultan of Sulu claimed rights over the northern end of the island. But the rule of the Muhammadan sultans at Bruni seems to have been preceded during some centuries by that of a line of Buddhist kings of Hindu origin, who probably represented an extension of Hindu and Buddhist influence by way of Java; for these Buddhist kings seem to have paid tribute to the Hindu kings of Java. The Arabs or their Malay converts seem to have displaced the Buddhist rule and culture in Bruni about the middle of

the fifteenth century; and a Malay sultan was established there when in 1521 Pigafetta, Magellan's lieutenant, paid a visit to Bruni in the course of the first circumnavigation of the globe.

Establishment of the rule of the Rajahs of Sarawak.

From that time onwards the Malay Sultans of Bruni continued to misrule the western coast of Borneo, until the beginning of an end was made by a young Englishman. Captain James Brooke, after retiring from service in the army of the East India Company, visited Sarawak in the year 1839 in his small yacht, and after playing a prominent part in bringing order and peace to that part of the Sultan's dominions which is now Sarawak proper (an area of 7,000 square miles), obtained from the Sultan of Bruni in 1842 authority to rule over that region with the title Rajah of Sarawak. From that date the history of this part of Borneo has been the steady extension of the beneficent rule of the Rajahs of Sarawak over the territory of the Sultans of Bruni. Successive portions were added to Sarawak by treaties which secured to the Sultan annual subsidies in return for the resignation of all other rights; until in 1905, by the purchase from the British North Borneo Company of the basin of the Lawas, a small river immediately north of Bruni, the Raj attained its present and presumably final dimensions of some 42,000 square miles (an area approximately equal to that of England and Wales). In the year 1888 the present Rajah, Sir Charles Brooke (who had succeeded his uncle, Sir James Brooke, in 1864), formally placed his country under the protection of the British Crown, while retaining independence in all internal affairs.

Establishment of British North Borneo.

The territory which is now British North Borneo was acquired by the commercial company of that name by purchase in successive instalments from the Sultans of Bruni and Sulu between 1877, when Mr. Alfred Dent opened the first negotiations, and 1898, when it attained its present extent (some 31,000 square miles) by the addition of what was then the northernmost part of Bruni. The Company, which was formed in 1881, acquired a charter from the British Government in 1882, and its territory,

together with Bruni and Sarawak, came under the protection of the British Crown in 1888. In spite of some native difficulties, which necessitated warlike operations during the closing years of last century, the Company's territory is now peacefully administered.

Bruni and Labuan.

The town of Bruni with the small remnant of adjacent territory that remains under the rule of the Sultan, after enjoying the status of a British protectorate from the year 1888, was brought under British administration in the year 1906, when a British resident was appointed to administer the state of Bruni and the adjacent small island of Labuan. The latter had been for some years under the government of the British North Borneo Company after enjoying since 1848 the status of a British Crown Colony.

Government of Sarawak.

The government of Sarawak has been widely recognized by impartial observers as a striking example (perhaps the most successful the world has yet seen) of the beneficent control of a population of the lower culture by representatives of Western civilization. Unlike so many other instances of such control, the rule of Rajah Brooke was in the first instance undertaken from a philanthropic desire to see the conditions of human life improved in a region where nature is bounteous but the ruder passions of men, the lack of social organization, and the misrule of barbarous despots had rendered the lives of the greater part of the population precarious, hard, and full of suffering. And in this spirit of enlightened beneficence the government has been consistently carried on by the two English gentlemen who have in turn held the title and position of Rajah of Sarawak. At the time of the acquisition of the Raj of Sarawak by Mr. James Brooke, the population of that region, and in fact of all the region that is now included in the Raj, were ground between the upper and the nether millstone: between the warlike tribes of the interior on the one hand, who were constantly forcing their way farther down the rivers, raiding and displacing the less vigorous coastwise people, and occasionally threatening the Sultan of Bruni himself, and on the other hand the rapacious and uncontrolled officers of the Sultan,

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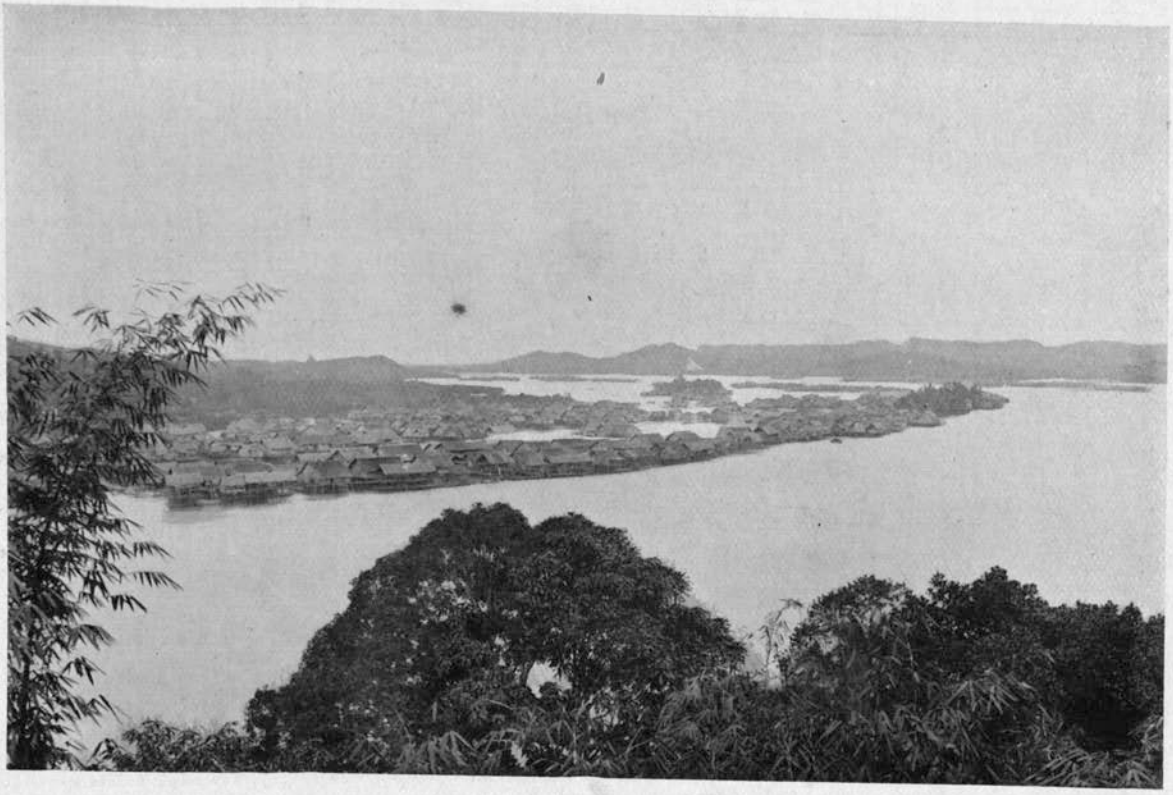

PLATE XXIV. BRUNI
(Visual Instruction Committee)

PLATE XXV. MOUTH OF RIVER ABAI, BRUNI

(Visual Instruction Committee)

who, aided in part by the Sea Dayaks, extorted in his name the largest possible tribute by a barbarous use of force and craft. The English Rajah thus found himself confronted with a double task, that of controlling the Malay nobles, who, jealous of his power, constantly intrigued against him, and that of pacifying and gaining the confidence of the wild and warlike tribes of the interior.

Pacification and administration.

Rapid progress was made with these tasks, though it was not always possible to dispense with the use of force, especially in dealing with an insurrection of the Chinese, which in 1857 nearly succeeded in destroying both the Rajah and his government; such force as has been used has always been obtained by employing the volunteer forces of the people in the cause of peace, order, and justice, rather than by introducing armed forces from without the Raj. Although in Sarawak proper the course of government has run smoothly since the quelling of the Chinese insurrection, the repeated addition of new provinces peopled by untamed tribes has necessitated an active policy of pacification and conciliation until almost the present time, when with the completion of the pacification of the territories last acquired a new era of peaceful and steady development of the arts of peace has set in. The successful administration, and above all the pacification of this considerable territory with its many warring tribes and disturbing elements, has been accomplished by the two white Rajahs not only through the wisdom of their personal handling of all native problems, but also by their wise choice of assistants. Of these the most important have been a small band of carefully chosen English gentlemen, which has been enlarged from time to time as the extent and needs of the country increased, until now it numbers some sixty members. Of these about a dozen assist the Rajah as heads of government departments in his capital at Kuching on the Sarawak River. The rest are stationed in a number of settlements in the lower reaches of the rivers. The Raj now comprises five governmental divisions, each of which is administered

by a divisional resident, and is divided into several districts. In each district is stationed a resident of subordinate rank, who with one or two white assistant officers and several native officers is directly responsible for the maintenance of order, the administration of justice, and the collection of taxes from the chiefs or headmen of the villages. Each such officer has for his head-quarters a small timber fort, and commands a small body, some dozen or more, of military police drawn from the Sarawak Rangers, a force of some 400 natives under military discipline, and a smaller number of native civil policemen. In the recently acquired territories the principal duty of such officers has been to gain the confidence and goodwill of the local chiefs and to convince them of the advantages that accrue from voluntary acceptance of and co-operation with the Rajah's government. And though occasionally it has become necessary to make a considerable display of force (as in the expedition of 1863 against the Kayans of the Rejang), the work has in the main been accomplished by purely moral influence. The policy pursued has always been to enlist the gratitude and sympathy of the leading chiefs, and to acquire their active co-operation in the work of government. To this end the leading chief of each tribe within each division has been appointed an officer of the government with the title *Penghulu* and provided with a flag and a document bearing the Rajah's signature, as insignia of his office. Each *Penghulu* is then made directly responsible to the resident of his district for the good conduct of his own people, and in nearly all cases the resident has been able to rely upon his loyal co-operation, especially in the investigation of serious offences and in the arrest of the offenders. The *Penghulu* in turn expects and generally obtains the co-operation and moral support of the subordinate house-chiefs of his district, each of whom exercises a very effective authority over the community that inhabits one long house.

Administration of Muham-

Among the Muhammadan population of the coast regions a similar system prevails; they dwell for the most

part in small villages of separate small houses, often built over the water on piles. Each such village has its headman, whose functions are similar to those of the house-chiefs of the pagan tribes; and in each district in which the Muhammadans are numerous a Malay of good standing is appointed to be a native officer of rank and functions similar to those of the *Penghulu*. madan villages.

The system of government is thus a beneficent despotism; the personal authority of the absolute ruler being freely delegated to a widening hierarchy of subordinates, and the whole system being bound together by ties of personal confidence and esteem between the officers of the various ranks. Although the Rajah is an absolute ruler, he governs with the advice of a Supreme Council consisting of himself, the divisional residents, and the three leading representatives of the Malays, namely, their religious head or high priest, their legal head, and a leading noble of the old aristocracy. A larger council consisting of all the white officers in charge of districts, and the principal native officers and *penghulus*, meets at Kuching once in every three years to discuss and advise upon the larger questions that affect the whole country; and this institution has done much to maintain among all its members a high sense of the dignity and responsibility of their positions. Councils.

At the time when Mr. Brooke became Rajah of Sarawak the country had long been under the rule of the Malay sultans, and Muhammadan law was the only recognized legal system. This, though imperfectly administered, was suitable to the needs of the coastwise population, and the Rajahs have wisely adopted it as the basis of the legal system and of the practice of the courts of justice; modifying it by decree from time to time, in order to bring it as far as possible into accord with Western standards of justice. In extending and modifying the system of criminal law, the provisions of the Indian Civil Code have been taken as a pattern for imitation. The special needs and circumstances of the large population of Chinese traders are met by the appointment of a body of legal Law.

assessors, elected by the Chinese from among their leading men; this body is empowered to deal judicially with all purely Chinese affairs, and to advise the regular judicial officers in affairs of more general concern in which the Chinese community or any of its members are interested. This arrangement has been found to work well; and it gives great satisfaction to the Chinese community, which for many years has proved itself entirely loyal and law-abiding, and an indispensable and harmonious part of the whole complex and heterogeneous social system. In dealing with the affairs of the interior peoples the Rajah's officers are expected to be guided largely by tribal custom and the principles of natural justice in applying the provisions of the Indian Penal Code. In all serious cases the magistrate is assisted by the *Penghulu* of the community to which the accused person belongs. Serious offences have been few, and only very rarely does the offender avoid arrest and punishment. The only tax imposed is a door-tax of two dollars (4*s*.) per family. This is collected by the house-chief, who transmits it to the resident of his district. It has in general been paid cheerfully, with a sense that full value is received in return.

The system of government briefly outlined above, by reason of its elasticity, its personal character, its unvarying regard for the interests of the people of so many different races and types and levels of culture, and its general efficiency and freedom from unnecessary formality, has proved excellently suited to the needs of the country. Its success is of course primarily dependent upon the wisdom and personal character of its head; but it is very doubtful whether any radical change of the system could be made without sacrificing much of that which has secured for the government of Sarawak so enviable a reputation and for the people of the country so much well-being and prosperity.

Government of British North Borneo.

British North Borneo is administered by a governor who is appointed by and responsible to the court of directors of the Chartered Company. He is assisted by a staff of white officers nominated by the court of directors, and

consisting of heads of the principal departments, three principal residents, and a number of district officers. The laws administered are those of the Indian Penal and Civil Procedure Codes and Evidence Acts, supplemented by a few laws which have been promulgated from time to time by the proclamation of the governor. The governor's authority is supported by a constabulary of some 600 men, a mixed force of natives of India (Sikhs for the most part) and of the country, officered by a few Europeans. In spite of some troubles with the natives in the closing years of last century, troubles which no doubt were connected with lack of experience and the natural desire of the Company to be able to pay some dividend to its shareholders, these difficult times seem to have finally given place to an era of peace and of general contentment and prosperity.

Administration of Bruni and Labuan.

The remnant of the state of Bruni, with the ancient capital of the sultans, and the island of Labuan, are now administered by a British resident. He is appointed by and responsible to the governor of the Straits Settlements, who is also High Commissioner for Sarawak and British North Borneo.

Missionary work.

Christian missionaries have recently penetrated among the wilder tribes of the interior of Borneo. On the lower waters of several of the rivers of Sarawak they have maintained stations for many years and have done excellent service in educating the native children of the localities. In Sarawak the missions of the Roman Catholics, of the Society for the Propagation of the Gospel, and of the American Wesleyans, have been the most active, and the first two in North Borneo. Many of the Chinese born in Sarawak have been converted to Christianity; but, as in so many other regions, the Christian missions do not succeed in converting any appreciable number of the Muhammadans. Until 1908 Sarawak, British North Borneo, and Labuan were included in the see of the colonial bishopric of Singapore; but since that date all the British territories of Borneo have been placed under a separate missionary bishopric.

Economic Conditions

Vegetable products.

The hot moist climate of Borneo, and the presence in almost all parts of a deep and fairly rich soil formed by the detritus brought down from the mountains by the many rivers, render the island very rich in natural vegetable products and capable of growing almost any crop that thrives in moist heat. The forests contain a vast amount of timber, much of which is of very large size and of hard wood, or possesses other qualities that must render it economically valuable if rendered accessible. But this economic resource has been but little worked. The jungle contains also a number of natural products which are gathered by the natives and sold or bartered by them to the Chinese traders, whose bazaars are found at almost all government stations in British Borneo. Of these jungle products, which are the chief source of such surplus wealth and luxury as the wild tribesmen enjoy, the principal are rubber and gutta-percha, camphor, rattan-canes, and the edible nests of the swift. The camphor of Borneo has long been highly prized by the Chinese; and for the birds' nests of the best quality they give very high prices. The latter are found in the roofs of immense limestone caves in several parts of Sarawak and North Borneo. The crystalline camphor is found as a deposit in the decaying heart of the camphor-wood tree (*Dryobalanops*). Rubber and gutta-percha have long been collected by the natives from the wild rubber creeper and the gutta tree by wasteful methods which destroy the plants. Rattan-cane of good quality and in large quantity is obtained from the stems of a number of species of a creeping palm. Aromatic resins are gathered in some quantity in North Borneo, and form one of the minor exports of that country. The agriculture of the tribesmen seldom produces sufficient *padi* or other grain to supply their needs throughout the year, and no rice is grown for the market. The chief agricultural exports are pepper, sago, rubber, and tobacco. Pepper has long been cultivated and

exported by Chinese settlers. Large quantities are now grown in and exported from Sarawak both by the Chinese merchants and the Borneo Company. It is grown chiefly in large gardens just above the swamp level in Upper Sarawak; the mode of growth and of cultivation is not unlike that of the hop in our Kentish fields.

Sago. Sago is largely grown in Sarawak, which exports about one-third of the world's supply. The granular product is pounded out from the pith of the stem of the sago palm. This handsome tree is found and worked in the jungle by the natives for their own supply; but it has been extensively planted by the villagers of the swampy coast regions, and by them the grain is extracted, to be exported by Chinese merchants after being washed and reduced to a fine white flour in their factories at Kuching. Tapioca also is obtained from a cultivated tuber and exported in considerable quantities.

Rubber. Rubber has been extensively planted during the opening years of this century by the Borneo Company and by several other European companies both in Sarawak and North Borneo; and under encouragement and instruction from the government, natives of all classes have begun to make small plantations of Para rubber and to extract the juice in approved fashion. Rubber has thus become a most valuable and rapidly increasing export. The climate and soil seem well suited for growing rubber of the best quality, and there is no obvious limit to the quantity that can be grown in the country.

Tobacco. Tobacco grows wild in many places in the jungle, even on the summits of the mountains, and has long been gathered and to a small extent cultivated by the natives for their own use. But the North Borneo Company has made large plantations and now exports large quantities of fine tobacco leaf, chiefly used for cigar-making. Coconut trees are grown in quantity in some of the coast regions of Sarawak and North Borneo for the production of copra.

Minerals. Gold occurs in the alluvial deposits of Upper Sarawak,

where it has been washed out for many centuries by Chinese settlers. During the last thirty years the Borneo Company has worked both the alluvial deposits and the mother rocks by the modern cyanide methods, and obtains the metal in quantities which render it one of the most valuable exports of Sarawak. Gold is known to occur also in North Borneo, but has not been worked.

Mercury is obtained by the Borneo Company in the form of cinnabar; and antimony is found in large and small pockets in the form of sulphide and has long been profitably worked on a considerable scale. Coal is not abundant, but a fine seam of hard coal crops out in Labuan and at Brooketown, and though it has been extensively worked it is very far from exhaustion.

In 1910 crude petroleum was obtained from a pipe sunk at Miri near the coast of Sarawak by one of the big oil companies to which had been awarded by the Rajah the exclusive rights to work mineral oil. Many other shafts have since been sunk a thousand feet or more, and copious supplies that seem inexhaustible have been tapped. The oil is of good quality, and reservoirs have been constructed in expectation of a large export of the oil and its products. There are geological indications that the oil-field is of great extent.

Manufacturing. In all British Borneo there is but little manufacturing industry beyond the processes of reducing to portable condition the raw products of the country. In addition to those already mentioned, the principal processes of this kind are the manufacture of *cutch* (used for tanning) from the bark of the mangrove tree; and of *jelutong*, an inferior kind of rubber prepared from a large variety of rubber trees that grow wild in the swamps.

Transport and communications. The rivers are the principal routes of transportation throughout Borneo. The towns and villages are with very few exceptions situated on their banks or at their mouths; and almost all coming and going of the natives is on their waters. In the upper reaches they travel in handy canoes that carry a crew of about a dozen men only and can be poled or pushed up stream over the

many rapids, and rushed over them in descending. In such canoes the jungle products of the interior are brought down to the Chinese bazaars, with the exception of the rattans; these are cut into lengths of two and a half spans and made up into rafts that are floated leisurely down stream under the guidance of two or three men, who build themselves a hut upon the raft. The larger bazaars are situated in those government stations in the lower reaches of the rivers that are accessible to small coasting steamers; and these are the great centres of local trade.

In Sarawak almost all articles of foreign trade are brought to Kuching, where the river makes the capital, twenty miles from the sea, accessible to steamers of 1,000 tons.

The mouths of the Rejang and Sadung Rivers also afford harbourage for large vessels, but beyond these there are no natural harbours in Sarawak. But at Labuan is a fine natural harbour capable of affording safe anchorage to the largest ships. North Borneo is fortunate in possessing a number of good natural harbours, of which the best, Sandakan on the east coast, has been chosen for the site of the administrative capital and head-quarters of trade, the town of Sandakan (population about 10,000). The company has established a number of smaller trading stations at various points of the coast; and between two of these, Jesselton and Weston, on the west coast, has constructed a line of railway which, however, has not given encouragement to an extension of the railway system.

Sarawak is not connected with Singapore by any telegraphic cable; but a cable is laid to Labuan, which forms a station on the Singapore to Hong Kong route, and Sandakan and several other stations of North Borneo are in telegraphic connexion with Labuan.

Commerce and trade.

The imports of British Borneo are in the main such as may be expected to be in demand among a primitive people newly brought into friendly contact with European civilization. Cotton cloth, largely from the mills of

Lancashire, crockery, steel bars to be worked up into various weapons and implements by the native smiths, lucifer matches, kerosene oil, and machinery for the local manufactories, are the principal imports from Europe. From other Eastern lands come rice, brassware from China and Java, salt and salt fish from Siam, tobacco from Sumatra, opium from Singapore, tea from China, and many other delicacies beloved of the prosperous Chinese merchants.

Both import and export trade is largely conducted by the large European trading companies, the Borneo Company, Limited, in Sarawak, and the Chartered Company in North Borneo. The former company was formed about the middle of the nineteenth century, a few years after the accession to power of Mr. James Brooke; it has enjoyed various concessions and monopolies, especially in respect of the working of gold and other minerals; and in return it has worked harmoniously with the Rajah's government and, while itself prospering greatly, has contributed largely to the steadily growing prosperity of the whole country. But the greater part of the export and import trade of British Borneo is in the hands of the Chinese merchants. The local retail trade is conducted for the most part by the Chinese and to a much less extent by Malays. These traders have their head-quarters in the various bazaars, where they buy the jungle produce brought down river by the natives, and retail the wares in demand among them; but some few of them make occasional excursions up river with boat-loads of wares which they peddle from village to village. Commercial operations are generally conducted by the aid of the cash currency, which consists of the silver dollars minted for the government of the Straits Settlements, and of smaller silver and copper cash issued by the governments of the two countries.

Bruni still exports a certain amount of decorated brassware and of ornamental cloths, for which it has long enjoyed a local celebrity, as well as a small quantity of sago. The revenues of this diminished state, from which

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PLATE XXVI. SEMBILING RIVER, BRUNI

(Visual Instruction Committee)

PLATE XXVII (*a*). SHAUKIWAN, HONG KONG (Page 439)

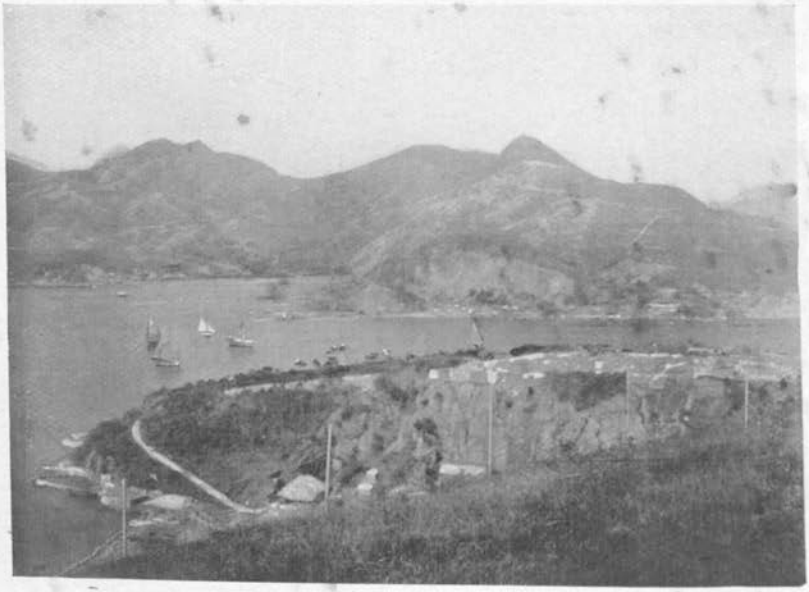

PLATE XXVII (*b*). LYEEMUN CHANNEL, HONG KONG (Page 443)
(Visual Instruction Committee)

the Sultan receives a handsome stipend of fixed amount, have not usually achieved a surplus over the expenditure; in other words the state is run at a loss by the British Crown, which has preferred to retain it under its immediate jurisdiction, owing no doubt to the strategic importance of the harbour and of the adjacent supplies of coal and oil fuel.

Literature.

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CHAPTER XIV

CHRISTMAS AND COCOS-KEELING ISLANDS

By Professor J. Stanley Gardiner

§ 1. *Christmas Island*

Christmas Island lies 550 miles east of Cocos-Keeling, in 10° 25′ S. lat. and 105° 42′ E. long., about 200 miles due south of the Sunda Straits. It is an isolated bank with 1,000 fathoms within 3 miles of the coast on all sides; Maclear Deep lies to the north and Wharton Deep to the south. The island is roughly a parallelogram, 9 miles long east to west and 3 miles broad, with great horns north-east and south-east and narrower points north-west and south-west; it covers about 43 square miles. It consists of a central plateau at about 600 feet, with Murray Hill (1,170 feet) towards the west, Phosphate Hill (935 feet) to the north-east, and Ross Hill (1,010 feet) to the south-east. The plateau descends to the sea in a series of steep slopes alternating with terraces, the last dropping in a

cliff of 200 to 300 feet to a shore terrace, terminating in a sea-cliff of 10 to 150 feet. The last cliff is much overhanging, having been undercut by the waves at its base to a depth of 30 feet or more. It is continuous round the island save in a few places, the chief of which is Flying Fish Cove, on the western side of the north-east horn, where the shore is formed of coral shingle. Here and in a few other small bays reef-building organisms, which are found everywhere round the island, have formed a true surface fringing reef.

The rock of Christmas Island consists of limestone, with volcanic rocks lying under and interstratified with its older parts. The limestones range from the Eocene up to recent reef deposits, the series being unique on an oceanic island. The terraced structure has been formed by repeated elevations and subsidences of the island since the commencement of the Tertiary period. The island may be considered an elevated atoll, but its structure is the antithesis of what might be expected from Darwin's theory of atoll formation, based on Cocos-Keeling, its nearest existing atoll.

Christmas Island occurs on a map by Pieter Goos, published in Holland in 1666. Dampier visited it in 1688 and gave a description. The first examination of the island was made in 1886 by H.M. surveying ship *Flying Fish*, which name was given to the anchorage. In 1887 H.M.S. *Egeria* called and remained ten days and sent rock specimens home. In the following year the island was annexed and placed under the Straits Settlements, owing to a report from Sir John Murray. In 1888 Mr. Clunies Ross, of Cocos-Keeling, founded a small settlement at Flying Fish Cove for planting, and in 1891 a lease was granted to Sir John Murray and Mr. Ross. In 1897 the Christmas Island Phosphate Company was formed to work the extensive deposits of phosphate of lime (Chapter XII).

The island on its terraces is covered by a considerable thickness of soil. Little cultivation, and that mainly of vegetables and fruit for home consumption, has been

undertaken. Consequently the indigenous vegetation is little touched, and the island is still covered by dense and rather impenetrable forests. One hundred and thirty phanerogams have been recorded, and there is a relatively rich flora of cryptogams, 61 being known. Very few are peculiar, most being Indo-Malayan, or widely distributed tropical forms; the rich cryptogamic flora is doubtless due to the spores of these forms being wind-borne. The fauna numbers 319 species; it is small for such a large and high island, but the insects have not been much collected. The size of both flora and fauna, as well as the species represented, clearly show the island to be oceanic. The fact that the animals and plants have been recorded when the island was practically untouched, gives a peculiar and enduring interest in Christmas Island to all students of geographical distribution.

The climate of Christmas is healthy and pleasant, the temperature being moderated by the ocean. The prevailing winds are from the south-east to east-south-east from May to December, but in January to April, which is the rainy season, they occasionally shift round to north or north-east. The thickness of the soil and the porous nature of the limestone prevent the formation of torrents or pools of stagnant water. Accessible water is difficult to find on the highlands, but there are good springs near the sea. Flying Fish Cove provides good anchorage in 2 to 10 fathoms during the easterly winds. It has piers, phosphate storage sheds, stores, coolie lines, workshops, and the residences of the magistrate, doctor, and manager. The coolies are mostly Chinese, and number about 1,100. There is a small Sikh police force, but serious crime is usually absent.

§ 2. *Cocos-Keeling Islands*

Cocos or Keeling Islands are a coral group, 700 miles south-west of Java, and near the route from Ceylon to Australia. They consist of two small ring-shaped reefs with islands, the southern situated about 12° 8′ S. lat.

and 96° 53′ E. long., and the northern 15 miles farther north. They form two absolutely isolated plateaux, rising steeply from over 2,000 fathoms. The northern has an almost complete enclosure of land, averaging a mile across, round a shallow pool, while the southern has about 21 islands round an area, 7 by 8 miles, with upwards of 8 fathoms in the centre and a passage for ships to the north. Both are atolls, and their islands are low coral lands.

The islands were discovered by Captain Keeling of the East Indian Company's service in 1609. Captain Clunies Ross landed on them in 1852, and settled them two years later. The same family still owns and rules them, but it is now much mixed with Malay blood. Charles Darwin visited them in H.M.S. *Beagle*, in 1836, and remained 10 days; he based his famous theory of the formation of coral reefs and of the subsidence of the tropical belt of the world on their structure. Later, they were examined by Forbes in 1879, by Guppy in 1888, and lastly, in 1905–6, by Wood-Jones, who has published a full and interesting description from all points of view.

The accounts published show the geographical changes which constantly go on in most isolated coral islands. The one interesting feature of the islands' history occurred after the devastation of a hurricane in 1876, when an eruption of foul water spread over much of the lagoon of the southern atoll, killing most of its organic life; this incident can only be taken as suggesting that the foundation of this coral atoll is on a volcanic peak at no great depth.

Most of the original fauna and flora of the Keeling Islands has been destroyed, but enough is known of it to say that it was of the regular oceanic coral-island type. As much of the land as is available for plantation has been planted with coco-nuts, the sole produce for export, but there is some guano on the northern atoll, which is uninhabited. The people number about 700, and are mostly of Malay descent. The islands are healthy, and possess good water. Britain took possession of them in

1857. They were placed in 1878 under the Governor of Ceylon and in 1886 were transferred to the Straits Settlements, being annexed in 1903 to Singapore. In 1902 they became a cable station of the Eastern Extension Telegraph Company, the cable being carried to them from Rodriguez.

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CHAPTER XV

HONG KONG

By O. J. R. Howarth

The fringe of islets which is characteristic of the Chinese seaboard, from Hainan to the north of the Yang-tse-kiang, forms, as it were, a knot off the eastern horn of the mouth of Canton River, where there is a small archipelago about the much-indented coast of the Kowloon Peninsula. Of this archipelago the most important, though not the largest member, is the island of Hong Kong, which gives name to the British territory comprising this and a number of other islands, together with the peninsular tract on the mainland. The island was ceded to Britain in 1841; the promontory of Kowloon, facing it across the narrow strait in which the harbour is situated, in 1860; in 1898 a number of adjacent islands, of which Lan-tao is the largest, and the whole of the peninsula as defined between the heads of Deep Bay and Mirs Bay (the 'New Territories'), were leased to Great Britain for 99 years. Hong Kong island is 29 square miles in area; the total area of the territory, insular and mainland, is about 405 square miles.

Physical features.

Hong Kong island (Hsiang-Kiang, the 'fragrant lagoon') is of irregular form, deeply indented on its southern coast especially, rocky and hilly. Along the western part of its northern shore, facing the mainland, the city of Victoria (known simply as 'the City') extends for some four miles; at the water-level wharves and

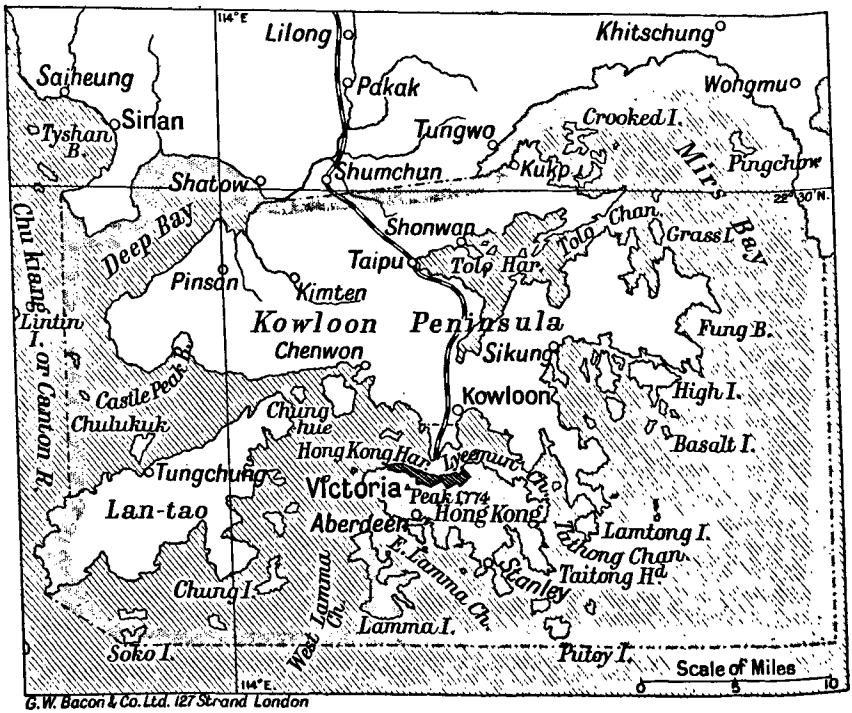

FIG. 18.

quays fringe the famous harbour which is formed by the strait and is one of the foremost ports in the world; behind the Praya, or esplanade, and the commercial quarter public buildings and residences cover the slopes upward towards the Peak, the highest point in the island (1,774 feet). Round the coast lie a number of villages, for the physical nature of the island, and also of the other principal islands, as Lan-tao and Lamma, is such that settlement is almost wholly coastal. The same is true

in a modified degree of the mainland territory; this shows a number of ranges of hills up to 3,000 feet or more in elevation, but they are interspersed with fertile valleys, in which, especially in the east, are numerous inland villages. The name of Kowloon, signifying 'Nine Dragons', is referred to nine prominent hills which dominate the peninsula. The prevalent geological formations are granite, schists, and basaltic rocks, and the first is of economic importance, being quarried freely. The hills are in great part bare of trees, but considerable areas have been afforested by the government, notably in the catchment areas of the Tytam and Pokfulam reservoirs. Avenues of shade trees are maintained in the city. The botanical and forestry department performs a further useful function in collecting and tabulating information regarding the raw or partly manufactured vegetable products which grow locally or in which trade is carried on at Hong Kong, including details as to source and demand, quantity and prices.

Climate.

The mean annual temperature recorded at the Kowloon Observatory is about 72° F. Monthly maxima of 87° or more are usually recorded in June, July, or August, and the highest shade temperature runs up to 90°–93° as a rule. During the whole season of the south-west monsoon (March to September) the heat may be hard for Europeans to bear—more so in Victoria than in Kowloon, for the capital is sheltered from this wind, whereas Kowloon is exposed to it. Monthly maxima of about 55°, and a lowest temperature of about 46° are recorded usually in January or February, towards the end of the season of the north-east monsoon. Differences in temperature as between points at or near the sea-level and on the high ground of the Peak are strongly marked, those of the upper levels being taken to average some 10° lower. There are also considerable differences in regard to precipitation and humidity. The average for the latter at Kowloon, however, is 77 per cent. The mean annual rainfall is about 80 inches, but here there is a rather wide range; in four recent years the rainfall

records read successively 91·87, 75·72, 70·12, and 90·55 inches. Almost all the rain falls in the hot season: a fall of 20 to 30 inches may be recorded in any month from June to August, or even as late as October; on the other hand, any month from October to February may pass with little or no rainfall. The number of rainless days per annum again ranges rather widely, but the average is about 230. In the season of the rains a day's fall of 6 to 8 inches or upwards is not uncommon. There is no lack of streams throughout the territory, and the water-supply is satisfactory. Typhoons are common, and often do very grave damage, especially if they occur before warning can be given from the observatory. Their economic effects may even be more than transitory; on the one hand, the damage to shipping brings an accretion of business to the shipbuilding and repairing works, but, on the other hand, the fear of damage and delay due to typhoons, on the part of shippers, was adduced in a recent report as a possible reason for a temporary decline in the output of bunker coal from the port, as it was thought that vessels were being preferably coaled elsewhere, at ports where this risk is less serious.

Health. The climate used to have an ill reputation for its effects upon Europeans, but the colony cannot now be called unhealthy. The death-rate among the non-Chinese community will usually be found to average 13 or less per thousand. Hong Kong shares, with tropical countries generally, the benefits which have followed the acquisition of a knowledge of more effectively combating malaria, and the deaths from this disease have markedly decreased. The regulation of water-courses, as a safeguard against malaria, has been effected in many cases. The average death-rate per thousand among the Chinese is about 23 or less. Wise ordinances in regard to the building of houses in the occupation of Chinese, the gradual abolition of their own old-fashioned types of dwelling, the provision of sufficient open space about dwellings, measures against overcrowding, and the general improvement of sanitary conditions, together with such works as that of

rendering buildings 'rat-proof', have combined to effect a generally steady betterment in the health of the community, under the administration of a sanitary department and the public works department as building authority. The march of improvement, however, may be arrested by exceptional circumstances, as when at the time of the Chinese revolution there was an immense influx of refugees into British territory; these brought some amount of disease with them, and temporarily rendered impossible the strict enforcement of such public health regulations as those directed against overcrowding. About 10 per cent. (on an average) of the deaths among Chinese are due to phthisis, apart from other tuberculous diseases which are also prevalent. Measures of safeguard against plague have been strengthened since the publication of the final report of the Indian Plague Commission in 1908. The number of deaths from beri-beri, again, has shown a general decrease, and good effects must result from such measures as making known the risk of contracting this disease through the eating of white rice without a considerable admixture of other foods.

The port and commerce.

The shipping facilities, except for the danger from typhoons, are excellent. Hong Kong harbour lies in the western part of the strait between the island and the mainland, which is about a mile wide at Hong Kong roads, with a depth of 5 to 9 fathoms, but deepens and narrows to little more than a quarter of a mile to the east, in the Lyeemun Channel. On the south side of the island Aberdeen or Shik-pai-wan harbour is sheltered by Aplichau island, and has docks; Deep Water Bay and Tytam Bay are also natural harbours.

The port is free, and complete statistics of its trade are therefore not to be obtained, but the total annual value of its trade is set down as approximately fifty millions sterling. Considerably over half a million vessels enter and leave annually; of ocean-going vessels the proportions under the British flag and under foreign flags are not far from equal, with the balance generally in favour of foreign ships. Of foreign vessels German and Japanese

are most numerous, followed (in numbers considerably lower) by French, Norwegian, Chinese, Dutch and American.

The trade is in very great proportion transit, Hong Kong serving as an emporium for the products of the East for export to European and other markets, and for European and other manufactures and goods consigned for distribution in eastern countries.

Tea and silk, coal, oil, sugar, cotton, and cotton goods, are among the principal items in a long list. The coal comes mainly from Japan, Northern China, and Manchuria. Large quantities of American flour are distributed from Hong Kong to China (especially when local crops of wheat and rice are poor there), and to Java, the Straits Settlements, Borneo, and other territories. It is easily to be understood that in Hong Kong the balance is held between sternly competitive interests in many departments of commerce, and such competition may even exceed the ordinary bounds, as when in 1908 a Cantonese boycott of Japanese goods was organized, and made itself felt in the British territory to such degree that somewhat serious rioting occurred.

Products and industries.

Rice and vegetables are cultivated in the fertile valleys of the New Territories, and a variety of fruits, including pineapples, oranges, plums, lichis, pears, and ground-nuts, together with sugar-cane and other crops. There are a number of industries, under either European or Chinese management, or both. Two large and a number of smaller engineering and shipbuilding establishments are maintained, some of the smaller works being in native hands. The trade, like most in the colony, is liable to rather marked fluctuation; a particular adverse influence, affecting it since the early years of the present century, may be remarked in the increased facilities provided by foreign powers for repairing their own warships, as by Germany at Tsingtao and by the American government in the Philippines. Typhoons, however, may confer certain obvious benefits upon this industry. Sugar-refining depends largely on a somewhat unstable market

in China, and has to meet competition from Java and Japan. Cotton-spinning, again, is an industry whose fortunes have been variable, but rope-making and cement-making generally maintain a steady position. Among industries which are purely Chinese, there may be mentioned the manufacture of rattan and fibre furniture, of native tobacco (which meets heavy competition from foreign importers), of knitted underclothing, leather goods, soy, ginger and preserves, lard and paper, and there are distilleries for *samshu* (spirits) and vinegar. Some of these native manufactures are widely exported. Thus the old-established furniture business sends its products all over the Far East, to Australia and South Africa, and even to America and Europe. The export of ginger is considerable: this manufacture was transferred to Hong Kong from Canton. Soy, a sauce made of the bean of *Glycine hispida* and wheat or barley, is exported to Europe and America; the paper mills have their market chiefly in China, but also to some extent in the Malay Archipelago and Straits Settlements; lard is exported to the Straits Settlements, Burma, and the Philippine Islands. The fisheries are of great importance to many seaside villages both on the islands and on the mainland. Many junks are employed in the deep-sea fisheries and steam-trawling has been introduced. Deep Bay, at the north-west of the Kowloon Peninsula, has oyster-beds. Salt-pans are successfully worked.

Communications.

The passenger steamers of many lines trading to the Far East make Hong Kong a port of call. As regards inland communications, there are tramways serving Victoria and its neighbourhood; a good road encircles the island, and the mainland territory is traversed from south to north by the British section of the Kowloon-Canton railway. Ferries connect the island and the mainland.

Population.

Of the total population (particulars of which will be found in the appendix, p. 486) all but roughly a fortieth part are Chinese. The non-Chinese population, somewhat exceeding 11,000 persons in all, includes some 2,000

Indians and 2,500 Portuguese, the latter being employed largely as clerks and in other similar positions both in government and in private offices. The British population approaches 2,000. Hong Kong is a port of transit not only for articles of commerce but for human labour; an immense number of Chinese emigrants and immigrants pass through annually, between their own country and fields of labour in the Straits Settlements, islands of the Malay Archipelago, and elsewhere. A great proportion of these are conveyed in British ships, though of recent years an increasing number have been carried in Dutch ships to and from the ports of Netherlands India, and in American ships to and from Hawaii. The bulk of the native trading and agricultural communities are Punti or Cantonese, but mainly in the hilly country is found a class known as the Hakkas or strangers.

Government.

The Crown colony of Hong Kong is administered by a governor, with the assistance of an executive and a legislative council. The executive council includes six official and two nominated unofficial members; the legislative includes seven official and six unofficial members. The last include representatives of the justices of the peace, the chamber of commerce, and the Chinese community. Revenues are drawn mainly from licences, rents, and land sales, and the post office. Stringent regulations restricting the use, import and export of opium and its compounds, which came into effect in and after 1909, reduced another considerable source of revenue, and to meet the loss duties were imposed on intoxicating liquors. English law is supplemented by local ordinances, and for the administration of justice there are three police magistrates and a supreme court. The amount of crime is appreciably affected by the existence of a large native population in constant movement between the colony and Canton, and as regards the residents in the colony, considered by themselves, it cannot be gauged. A police force about 1,000 strong is maintained, and there is also a force of district watchmen who patrol the Chinese quarter of the city; the Chinese community supports it

with the assistance of a contribution from the government. The fact that since the British occupation the population of the island of Hong Kong alone has multiplied more than thirty-fold is evidence of the reliance placed by the Chinese in the British rule.

Defence. Hong Kong is the principal British naval station in the Far East; a strong garrison is maintained, towards which the colony contributes 20 per cent. of its revenue, and a volunteer force is wholly maintained by the colony.

Hospitals. Some indication has been given of the government provisions in the direction of the public health. Several hospitals, and a large observation station to deal with outbreaks of infectious disease on vessels arriving at the port, are maintained by the government, which also assists the Tung Wa Chinese hospital, an institution which not only deals with sickness but performs such other services as the free burial of the poor, repatriation of destitutes, and charitable organization. Either Chinese or Western methods of treatment in sickness are to be obtained by patients at will, and the two classes of treatment are about equally availed of. There are other Chinese hospitals and also missionary hospitals, which receive government support, besides others again which do not; among the last may be named the old Hong Kong College of Medicine (merged into the medical faculty of the university), and the Chinese public dispensaries, one of which is established on a hulk, and specifically serves the large boating population (called Tankas).

Culture. Education is provided for by some 70 schools, either government institutions or 'grants' schools, the latter being maintained by religious or other bodies but receiving financial aid from the government. In the higher-grade schools, about 20 in number, instruction is given (with a few exceptions) in English. The lower-grade schools include one especially for the children of British Indians. There are among the government schools a British boys' school and girls' school. Queen's College and the Technical Institute are the most important of the older educational establishments, but in 1912 the Hong Kong

University was opened: the fund for its building was given by Sir Hormusjee Mody, and that for endowment was raised by private subscription. Faculties of medicine, engineering, and arts were the first to be provided.

Bibliography. See annual *Colonial Reports* and other official publications; *Handbook to Hong Kong* (1893).

CHAPTER XVI

WEI-HAI-WEI

By O. J. R. Howarth

The Wei-hai-wei Territory, held on lease from China, covers an area of 285 square miles bordering the Yellow Sea, on the coast of the foreland of Shantung, facing northward. It comprises a coast-line about 70 miles in length, and is bounded by an (approximate) arc of a circle whose centre is that of the bay in which the harbour is situated. This harbour, naturally sheltered by the island of Liukung, constitutes the reason for the acquisition of the territory; it is used by the British Naval Squadron in Chinese waters, while China retains the right for her warships to do the same.

Physical features. The coast, generally low and sandy, broken by a succession of promontories and occasionally by rocks and slight cliffs, is backed by hills of no great elevation, which cover and diversify practically the whole surface of the territory. The highest of these hills—Chengchi-shan of the Chinese, Mount Macdonald of the British—rises no higher than 1,700 feet. They are in great part bare, though they carry considerable areas of oak scrub: their outlines are not generally bold but their flanks are profoundly eroded, and some of the many valleys which intersect them are very beautiful, nor is the scenery of the territory generally unpleasing, whether coastal or inland. Liukung island, with a length of 2¼ miles and a circumference of 5, rises picturesquely from the quiet

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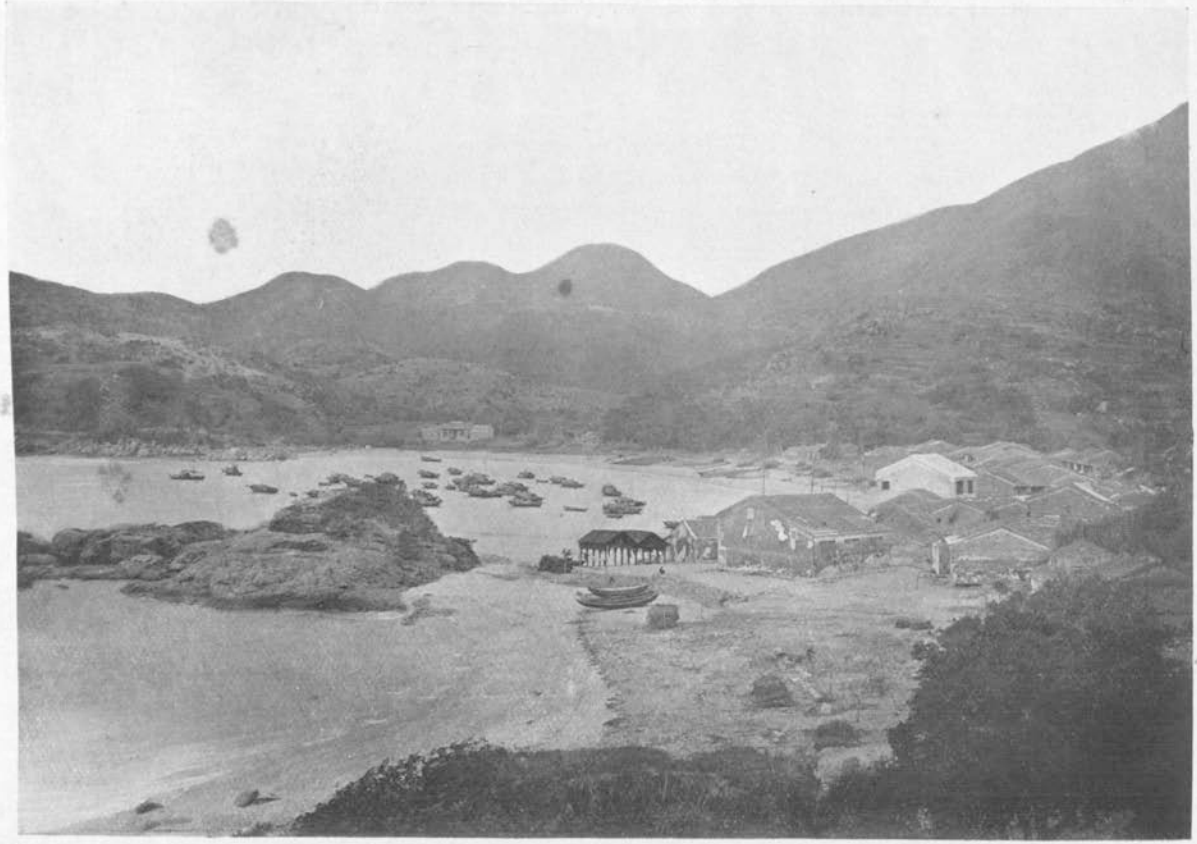

PLATE XXVIII. STANLEY, HONG KONG

(Visual Instruction Committee)

PLATE XXIX. PORT EDWARD, WEI-HAI-WEI, WITH LIUKUNG ISLAND

(Visual Instruction Committee)

water of the harbour to a height of 500 feet; towards the harbour it slopes easily, but towards the open sea it presents rugged cliffs.

The climate is of good repute. The temperature shows a rather wide range: in winter extremely cold north winds prevail, while in July and August a damp heat is experienced, for these are the months of heaviest rainfall. The Climate, hydrography, vegetation, fauna.

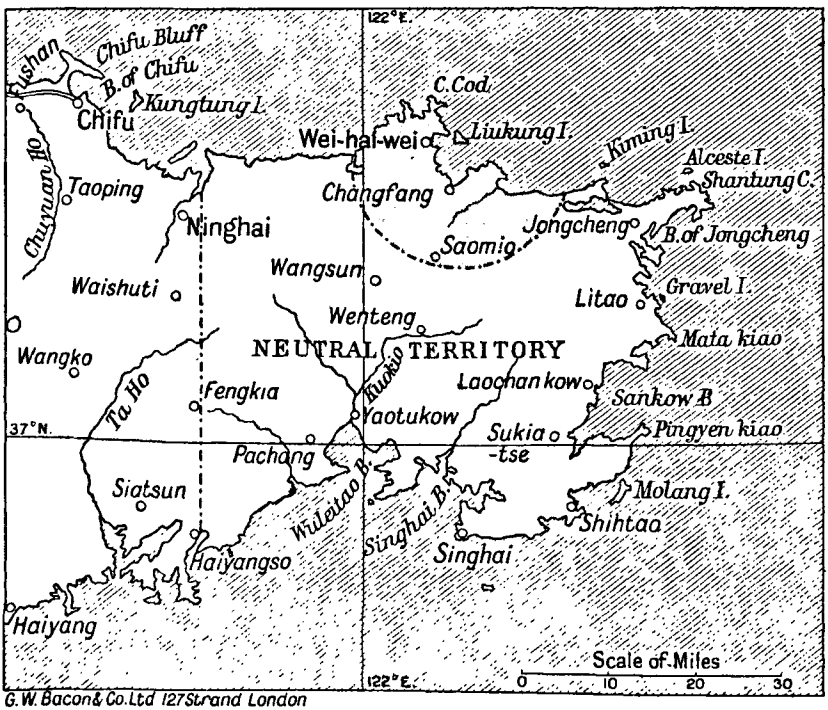

FIG. 19.

temperature does not then, however, usually exceed 94° F., and the spring, and more especially the autumn, are very pleasant seasons. European visitors come to the territory to escape the more trying conditions of the summer climate of places farther south in China, and of Hong-Kong; and the neighbourhood of Port Edward, the British settlement on the mainland, is not lacking in amenities for white residents and visitors.

The territory has no large river, and on the whole is

rather poorly watered. Its short streams send down heavy floods in the wet summer, but these run quickly off, for there are no natural conditions, lakes, or forested tracts, to steady the flow, and the streams are at other times generally shallow and exiguous. The appearance of a meagre vegetation which is presented by much of the territory is due partly to the circumscribed area fit for cultivation, but also to the serious disforestation to which the land has been subjected. Some little endeavour has been made under British rule to remedy this condition, and apart from this the numerous villages and burial grounds are commonly surrounded by groves, while trees flourish also along the water-courses. Firs, ailanthus, white poplar, cypress, walnut, pomegranate, wax-tree, and maidenhair tree, are among the native trees known under English names, while the acacia, Lombardy poplar, laburnum, yew, and others have been introduced.[1] A number of familiar British flowers are common, or have been introduced. The wolf, fox, and wild cat occur, and hares abound; duck, teal, and wild geese are visitors; the snipe provides good sport, partridges and a few woodcock and pheasants are also found.

Occupations and trade.

Agriculture occupies the great bulk of the population. Wheat, millet, maize, barley, buckwheat, beans, and ground nuts (an important article of export) are all raised in considerable quantities; many vegetables are grown, but little fruit, although government experiments in this last direction have given good results. The natives are careful and thorough farmers. Other occupations include the rearing of silk-worms on the natural oak-scrub of the hills, the manufacture of silk, and fishing. Gold is known to occur, and attempts have been made to work it.

Some good roads have been made during the British occupation, and other measures have been taken for the development of the trade of the territory. The harbour, however, is without the geographical advantages, in regard to relationship with a rich and important hinterland, which are possessed by such ports as Chifu and

[1] R. F. Johnston, *Lion and Dragon in Northern China*, London, 1910.

Tsingtao, and its trade is not large, though in itself it is naturally excellent, easy of entrance and providing a deep anchorage, well sheltered under Liukung island, on which are a number of shipping offices and native shops. Trading steamers anchor mainly off Port Edward. The chief exports are ground-nuts and seeds, and salt fish. Flour, oil, cotton goods, sugar, timber, provisions, and coal are imported. The port is free of duty. Local trade is carried on in markets at the native town of Wei-hai-wei and at some of the principal villages; annual fairs are also held, associated, as they so commonly are or have been in other lands, with religious observances.

Population and administration.

The territory has a population of about 150,000 (147,133 at the census of 1911), inhabiting upwards of 300 villages. The resident white population is small (some 200 in all), consisting of a few officials, missionaries, and traders: some live on Liukung island (where there is also a naval establishment), the rest mainly at Port Edward, formerly named Matou, on the mainland, where Government House and the government offices are situated. Great Britain leased the territory from China in 1898, after Port Arthur had been occupied by the Russians on a lease which would have run, save for after events, till 1923. The replacement of Russian by Japanese rule in Port Arthur might, on the terms of the original understanding, have been followed by the evacuation of Wei-hai-wei by the British, but no specific date for the determination of the lease was specified. Beyond the territory itself Great Britain has the right, over an area of some 1,500 square miles east of the meridian of 121° 40′ E., of stationing troops, erecting fortifications, and carrying out other military works, but no necessity of exercising this right has arisen. Within the territory itself administration is wholly in British hands (though the natives are not strictly British subjects, nor do they as a whole render any sort of allegiance to the British Crown or flag), save in the town of Wei-hai-wei. This is a small native place of 2,000 inhabitants, surrounded with a picturesque castellated wall of generous extent in

relation to the buildings it encloses: the signification of the name is given as the fort or military district (more than one of which were established against Japanese piracy on this coast) of the 'august ocean', the two syllables *wei* having different tones, symbols, and meanings (Johnston). Chinese jurisdiction is in force in this town, provided that it does not conflict with British naval or military arrangements. The British administration is under the control of the Colonial Office: the status of the territory is somewhat similar to that of a Crown Colony. A civil commissioner governs the territory, and has the power, subject to the assent of the Crown, of promulgating administrative ordinances. There are northern and southern divisions of the territory, the former containing nine and the latter seventeen districts under native headmen; the magistrates for these divisions have their head-quarters at Port Edward and at Wen-chuan-tang respectively. The magistrates deal with both criminal and civil cases, and native law and custom is observed in all purely native disputes, so far as such observance is not incompatible with British views of 'justice and morality'. There is a high court, which has rarely to sit, and from which an appeal lies to the supreme court of Hong-Kong. A small police force is maintained, but there is no military establishment, a Chinese regiment, which was trained under British officers, having been disbanded in 1906.

Revenue is derived mainly from a land-tax; among other sources are a road-tax, shipping registration, and other dues, wine and opium monopoly, and various fines. (The use of opium has been prohibited, save for strictly medical purposes.) A grant-in-aid from the British exchequer is required to balance revenue and expenditure.

Native and British relations: education.

The Chinese have in general acquiesced readily in the British administrative system. The natives of Wei-hai-wei have on the whole conservative traditions, which have been respected. This condition will be found not unnatural if considered from the geographical standpoint, for the Shantung region possesses a distinct physical

individuality, and its valleys would appear well fitted for the home of a people not readily to be brought under influences from without. In this connexion it may be observed that the revolution of 1911 occasioned *émeutes* on the frontier of the territory, which had to be protected by British armed forces: the town of Wei-hai-wei, however, accepted the republican movement. The administration is based, broadly speaking, on the principles of Confucianism. The adaptability of British methods of colonial government to native custom has received no mean endorsement by its results in Wei-hai-wei: a typical concrete instance is exhibited by the writer of *Lion and Dragon in Northern China*, who, finding that the natives often preferred to present their cases in secret or (failing the possibility of this) would permit abuses to continue unknown to the administration, established a 'petition-box' in which statements might be placed with the understanding that they would come under his notice solely. Education reaches no high standard; some 6 per cent. of the inhabitants can read and write; a government free school and several mission schools are maintained, but their pupils average together barely 200. The Chinese, however, concurred in the levying of a tax on theatrical performances, in aid of village schools. There is a school for sons of Europeans, which, particularly in view of the healthy climate, is in favour with residents at the Chinese treaty ports and Hong-Kong.

Bibliography.

See Johnston (op. cit.); E. G. Bruce-Mitford, *The Territory of Wei-hai-wei* (Shanghai, 1902); official *Reports* (annual).

GAZETTEER OF TOWNS

(*Note.*—The towns included in this list have been selected partly on a basis of population, but also, especially in the case of certain smaller towns, with reference to their importance in relation to the localities in which they are situated. The figures for longitude and latitude are approximate. The figures for population are in accordance with the latest available census returns, and the increase or decrease per cent., which in some cases follows these figures, cover the period of the preceding decade.)

INDIA

Agra, 27° 10′ N., 78° 3′ E., United Provinces, on the right bank of the River Jumna, 843 m. NW. of Calcutta, 130 m. SE. of Delhi by rail; is an important railway junction and one of the leading commercial centres in the north-west. Industries include cotton gins, cotton mills, carving in marble, the preparation of mill-stones, grinding-stones, and stone mortars, inlaying of precious stones in marble, and the manufacture of carpets. An important educational centre, and the seat of Roman Catholic archbishop. Pop. 185,449, decrease 1·4 per cent.

Ahmadabad, 23° 2′ N., 72° 35′ E., Bombay, on the Sābarmatī River, 310 m. by rail NNE. of Bombay, and about 50 m. N. of the head of the Gulf of Cambay, is one of the most picturesque cities in the Bombay presidency. It has large cotton mills, dye works, and manufactures of silk and brocaded goods, gold and silver thread, famous pottery, shoes and leather goods, and black-wood carving. Seat of Gujarat College, affiliated to Bombay University. Pop. 215,835, increase 16·1 per cent.

Ajmer, 26° 27′ N., 74° 37′ E., Rajputana, capital of the small British province of Ajmer-Merwara, situated at the foot of the Taragarh hill, 275 m. by rail S. of Delhi, is an important railway junction, and a large trade emporium, especially for cotton, salt, and opium. Large railway workshops and manufactures of cotton. Seat of the Mayo College, where the sons of chiefs and nobles are educated. Pop. 86,222, increase 16·8 per cent.

Aligarh (Koil), 27° 53′ N., 78° 4′ E., United Provinces, 876 m. by rail NW. of Calcutta, 80 m. by rail SE. of Delhi, has considerable trade in cotton, grain, and indigo, and cotton gins, flour mills, and lock factories. Seat of a celebrated Muhammadan Anglo-Oriental College, affiliated to Allahabad University, which is attended by students from all parts of Asia and of Africa. Pop. 64,825, decrease 8 per cent.

Allahabad, 25° 26′ N., 81° 50′ E., seat of government of the United Provinces, on the left bank of the Jumna River on the wedge of land formed by its confluence with the Ganges, 564 m. by rail WNW. of Calcutta, 390 m. by rail SE. of Delhi, is an important railway and commercial centre. Situated at the junction of two holy rivers, the city has become a place of pilgrimage for the Hindus. It is the most important educational centre in the United Provinces, and has a university, the Muir College, a training school for teachers, and other schools; seat of Roman Catholic bishop.

Large printing establishments, flour mills, brick and tile works, and extensive trade in grain, oilseeds, sugar, cotton goods, and metals. Pop. 171,697, decrease 0·2 per cent.

Ambala or **Umballa**, 30° 23′ N., 76° 46′ E., Punjab, 105 m. by rail N. of Delhi, 848 m. by rail NE. of Karachi, is an important railway junction, and one of the largest cantonments in India. It has considerable trade in grain, cotton, and hill products, such as ginger, turmeric, *charas*, and serves as a dépôt for the supply of Simla; has cotton gins and presses, flour mills, and a manufacture of excellent carpets. Pop. 80,131, increase 1·9 per cent.

Amritsar, 31° 38′ N., 74° 53′ E., Punjab, 33 m. E. of Lahore, 816 m. NE. of Karachi by rail; is the holy city of the Sikhs, and one of the most important commercial and industrial centres in Northern India. Industries include the manufacture of carpets, which are made entirely on hand-looms, silk goods, wood carving, ivory carving, brass and copper goods, and cotton-ginning factories, cotton mills, and flour and rice mills. Pop. 152,756, decrease 6 per cent.

Bangalore, 12° 58′ N., 77° 35′ E., Mysore, 219 m. by rail W. of Madras, lies in the middle of the Mysore table-land, 3,113 feet above sea-level, and has a healthy climate. Cotton, woollen, and silk mills, oil mills, soap factory, railway workshops, brick and tile works, and coffee-curing works. Pop. 189,485, increase 19·1 per cent.

Bareilly, 28° 22′ N., 79° 24′ E., United Provinces, 812 m. NW. of Calcutta, 152 m. E. of Delhi by rail, situated on the Rāmgangā River, is an important railway junction, and has a large trade in grain, sugar, hides, hemp, and oil seeds. Has manufactures of furniture made both of bamboo and of the usual timbers, and sugar refineries. Pop. 129,462, decrease 2·8 per cent.

Baroda, 22° 18′ N., 73° 15′ E., capital of the native state of Baroda, on the Vishnamitri River, 244 m. by rail NNE. of Bombay, is an important railway junction, and has manufactures of cotton goods, carpets, and wood carving. Pop. 99,345, decrease 4·3 per cent.

Benares, 25° 18′ N., 83° 1′ E., United Provinces, on the north bank of the Ganges, 479 m. by rail NW. of Calcutta, is the holy city of the Hindus, and attracts a great number of pilgrims, while most Hindu princes have residences here. Besides the trade it derives from the pilgrims, Benares is a great distributing centre; manufactures include ornamental brass-ware of high repute, silk goods both plain and embroidered with gold and silver, jewellery, German-silver work, and lacquered wooden toys. Seat of Benares College, and of Central Hindu College, affiliated to the Allahabad University. Pop. 203,804, decrease 4·4 per cent.

Bhagalpur, 25° 15′ N., 87° E., Bengal, situated on the right bank of the Ganges, 265 m. by rail NW. of Calcutta, has an extensive trade in agricultural produce, and manufactures coarse coloured glass used for making bracelets; seat of the Jubilee College. Pop. 74,349, decrease 1·9 per cent.

Bhopal, 23° 16′ N., 77° 25′ E., capital of native state of Bhopal, Central India, picturesquely situated on the border of two lakes, 521 m. by rail NE. of Bombay, is an important railway junction, and has manufactures of cotton, jewellery, and the preparation of *gutka*, a mixture of saffron, lime, and other ingredients eaten with betel-leaf, of which the Bhopal variety is famous all over India. Pop. 56,204, decrease 27 per cent.

Bombay, 18° 55′ N., 72° 54′ E., capital of Bombay presidency and the principal seaport of Western India, is situated on Bombay Island,

which by means of causeways and breakwaters is united with Salsette Island and so continuously with the mainland. In the beauty of its scenery and in the commercial advantages of its situation, Bombay is unsurpassed by any city in the East. The wide harbour, studded with islands, is one of the finest in the world. It is the principal seat of the cotton industry in India, while dyeing, tanning, metal working, and salt works are very prosperous trades. Chief exports are raw cotton, grain, opium, cotton twist and yarn, ivory, and coffee; imports are cotton goods, sugar, metals, and machinery. Has a university, numerous colleges, and technical institute; seat of Roman Catholic archbishop and of Anglican bishop. Pop. 947,445, increase 26·2 per cent.

Calcutta, 22° 34′ N., 88° 22′ E., seaport, and capital of Bengal, on the Hooghly River, 86 m. from the sea, is connected by converging lines of railway, rivers, canals, and roads with the rich valleys of the Ganges and Brahmaputra, whose produce it exports oversea, while supplying these densely populated regions with the products of other countries. It is, therefore, the first port of India, the chief exports being raw and manufactured jute, tea, opium, hides and skins, oil-seeds, grain and pulses, indigo, raw cotton, raw silk, and saltpetre; the chief imports are cotton goods, metals, oil, sugar, and machinery. Industries, located mostly in its suburban municipalities, specially at **Howrah,** on the right bank of the Hooghly River, include large jute mills, cotton mills, oil, flour, and rice mills, tanneries, potteries, brass works, foundries, railway workshops, engineering workshops, rope works, and salt-crushing mills. It has a university, and numerous educational institutions; seat of an Anglican bishop, who is the metropolitan for India and Ceylon, and of a Roman Catholic archbishop. Here are situated the government dockyards, with an arsenal, and Fort William, the largest fortress in India. Pop. 896,067, increase 5·7 per cent.; with suburbs 1,222,313, increase 10·4 per cent; of Howrah, 179,006, increase 13·6 per cent.

Calicut, 11° 15′ N., 75° 47′ E., Madras, seaport on the west coast, 566 m. SSE. of Bombay, 414 m. by rail ESE. of Madras, is a picturesque place (the streets winding through continuous groves of palms and other tropical vegetation), with a healthy climate. Exports large quantities of coffee, while grain and salt are the chief imports; has cotton and saw mills, and coffee-curing works. The chief temple of Calicut is held in great repute. Pop. 78,417, increase 1·9 per cent.

Cawnpore, 26° 28′ N., 80° 21′ E., United Provinces, situated on the right bank of the Ganges, 684 m. by rail WNW. of Calcutta, is an important railway and commercial centre. It has cotton, woollen, flour, and jute mills, cotton gins, and manufactures of sugar, leather, boots and shoes, harness and saddlery, cheap cutlery, and chemicals. Seat of Christ Church College, affiliated to Allahabad University. Pop. 178,557, decrease 12 per cent.

Coimbatore, 11° N., 76° 58′ E., Madras, picturesquely situated on the left bank of the Noyil River, at the mouth of the Bolampatti valley, 305 m. by rail SW. of Madras, is a healthy and pleasant town with a light annual rainfall and moderate mean temperature. Industries include cotton presses and mills, tanneries, coffee-curing works, distillery, sugar refinery, and saltpetre refinery. Pop. 47,007, decrease 11·4 per cent.

Cuttack, 20° 29′ N., 85° 52′ E., Bengal, situated at the head of the delta of the Mahanadi, 230 m. by rail SSW. of Calcutta, is noted for its filigree

work in gold and silver. Seat of Ravenshaw College, and several other important educational institutions. Pop. 52,528, increase 2 per cent.

Dacca, 23° 43′ N., 90° 24′ E., capital of Eastern Bengal and Assam Province, situated on the north bank of the Burhi Ganga River, 8 m. above its junction with the Dhaleswarī, 254 m. by rail NE. of Calcutta, is the most important mart of Eastern Bengal. Jute, oil-seeds, and hides are exported, and cotton goods, salt, and oil are imported. Industries include cotton weaving, boat building, shell carving, embroidery, and famous silver filigree work. Seat of Dacca College, affiliated to Calcutta University, and of a Roman Catholic bishop. Pop. 108,551, increase 21 per cent.

Delhi, 28° 39′ N., 77° 15′ E., Punjab, capital of India, situated on the right bank of the River Jumna, at the spot where the northernmost spurs of the Aravalli Hills abut on the Jumna, 956 m. by rail NNE. of Bombay, 950 m. by rail NW. of Calcutta, is an important railway, industrial, and commercial centre, with an enormous trade. Industries include, besides modern cotton and sugar mills, cotton gins and presses, and sugar factories, manufactures of jewellery, brass and copper ware, pottery, ivory carving, gold and silver filigree work and embroidery, and miniature painting. Pop. 232,837, increase 11·6 per cent.

Fyzabad (-cum-Ajodhya), 26° 47′ N., 82° 10′ E., United Provinces, 599 m. by rail NW. of Calcutta, is an important railway junction, and has considerable trade in agricultural produce, chiefly rice; important centre of sugar-refining industry. Pop. 54,655, decrease 23·2 per cent.

Gaya, 24° 49′ N., 85° 1′ E., Bengal, on the Phalgu River, 200 m. by rail NW. of Calcutta, is a sacred spot and place of pilgrimage of Hindus. Pop. 49,921, decrease 30 per cent.

Hyderabad, 17° 22′ N., 78° 27′ E., capital of the native state of Hyderabad, on the Musi River, a tributary of the Kistna, 492 m. by rail SE. of Bombay, is a great collecting and distributing centre, and has cotton mills; seat of Roman Catholic bishop. Pop. 500,623, increase 11·6 per cent.

Indore, 22° 43′ N., 75° 54′ E., capital of the native state of Indore, Central India, situated on the River Saraswati near its junction with the Khan, 440 m. by rail NE. of Bombay, is one of the largest commercial centres in Central India, the chief exports being grain, tobacco, opium, and metal vessels. It is the head-quarters of the Malwa Opium Agency. Pop. 44,947, decrease 48·1 per cent.

Jaipur, 26° 55′ N., 75° 50′ E., capital of the native state of Jaipur, Rajputana, 191 m. by rail SW. of Delhi, is the largest city and on account of its extensive banking and exchange business has been called the Lombard Street of Rajputana. Industries include cotton pressing, dyeing, carving in marble, enamelling on gold, pottery, and brass work. Pop. 137,098, decrease 14·4 per cent.

Jubbulpore, 23° 10′ N., 79° 57′ E., Central Provinces, 616 m. by rail NE. of Bombay, situated in a rocky basin surrounded by low hills, about 6 m. from the Narbada River, is an important railway junction. Has the workshops of the Great Indian Peninsula Railway, cotton, oil, and flour mills, pottery works, and manufactures of images from marble, and of ornaments from agate pebbles. Seat of a college affiliated to the Allahabad University. Pop. 100,651, increase 11·2 per cent.

Karachi, 24° 51′ N., 67° 4′ E., Bombay, seaport at the extreme western end of the Indus delta, 993 m. by rail and 483 m. by sea NW. of Bombay, is

the sea terminus of the North-Western Railway, and the principal gateway for the trade of the Punjab and part of Central Asia. Exports wheat, cotton, wool, oil-seeds, hides, and bones, and has manufactures of cotton, cloth, carpets, and foundries. Pop. 151,903, increase 30·2 per cent.

Lahore, 31° 35′ N., 74° 20′ E., capital of the Punjab, situated on the River Ravi, 1,280 m. by rail N. of Bombay, 298 m. by rail NW. of Delhi, is an important railway junction, and collecting centre of agricultural produce. It has cotton gins and presses, cotton, flour, and oil mills, printing, lithographic, and bookbinding establishments, and manufactures of soap, candles, sulphuric and nitric acid, brick, tiles, shoes, saddlery, plain and decorated wooden furniture, and the workshops of the North-Western Railway. An important educational centre; seat of the Punjab University, and of Anglican and Roman Catholic bishops. Pop. 228,687, increase 12·7 per cent.

Lucknow, 26° 52′ N., 80° 56′ E., United Provinces, on the Gumti River; 885 m. by rail NE. of Bombay, is an important railway centre, and has railway workshops, foundries, printing establishments, and paper mills. Native manufactures are cotton fabrics, the famous *chikan* or embroidery in silk or cotton on muslin, gold and silver embroidery, pottery, and celebrated clay models and figures, representing types of native life. Important educational centre; seat of Anglican bishop. Pop. 259,798, decrease 1·6 per cent.

Madras, 13° 4′ N., 80° 15′ E., seaport and capital of Madras Presidency, built in a straggling fashion on the shore of the Bay of Bengal, occupies a wide area, and has something of a rural aspect. Industries include cotton mills, cement and tile works, tanneries, iron foundries, cigar factories, aluminium utensils; while native arts are silk and cotton weaving, silver work, and embroidery. Chief exports are hides and skins, cotton, tea, coffee, and grain. Has a university, and is the seat of Roman Catholic archbishop and of Anglican bishop. Pop. 518,660, increase 1·8 per cent.

Madura, 9° 55′ N., 78° 7′ E., Madras, 345 m. by rail SW. of Madras, has cotton mills, while the chief native industry is weaving, producing pure silk fabrics, and cloths of mixed silk and cotton. Pop. 134,130, increase 22·2 per cent.

Mandalay, 21° 59′ N., 96° 6′ E., Upper Burma, on the left bank of the Irrawaddy, occupies part of a plain, here 8 m. wide, between the river and the Shan range; 410 m. by rail NNE. of Rangoon. Native industries include hammered silver-work, wood carving, iron works, a kind of embroidery called *swechido* of gold and silver thread and spangles, and brass and marble images of Buddha, some of colossal size; there are also a few rice and timber mills. Pop. 138,299, decrease 24·8 per cent.

Meerut, 29° 1′ N., 77° 43′ E., United Provinces, situated half-way between the Jumna and the Ganges, 931 m. by rail NNW. of Calcutta, 48 m. by rail NE. of Delhi, is a trading centre of some importance, especially for cotton, and has a flour and oil mill, and a large soap factory. Pop. 116,227, decrease 1·6 per cent.

Mirzapur, 25° 9′ N., 82° 35′ E., United Provinces, on the right bank of the Ganges, 509 m. by rail ENE. of Calcutta, is noted for the manufacture of woollen carpets dyed with native vegetable dyes, and has numerous factories for the preparation of shellac from stick-lac, found in the neighbouring jungles. Manufactures of brass-ware, and cotton mills. Pop. 32,446, decrease 50·9 per cent.

Moradabad, 28° 51′ N., 78° 46′ E., United Provinces, situated on the right bank of the Rāmgangā River, 110 m. by rail E. of Delhi, has a large trade in sugar, wheat, and rice, and manufactures of ornamental brass-ware and cotton goods. Pop. 81,168, increase 8 per cent.

Multan, 30° 12′ N., 71° 31′ E., Punjab, situated 4 m. from the left bank of the Chenāb, 576 m. by rail NE. of Karachi, is an important railway junction and trade centre, especially for wheat, sugar, cotton, indigo, and wool. Industries include silk and cotton weaving, carpet making, glazed pottery, enamel work, and the manufacture of tin boxes. Pop. 99,243, increase 13·6 per cent.

Mysore, 12° 18′ N., 76° 40′ E., capital of the native state of Mysore, picturesquely situated at the north-west base of the Chamundi Hills, 245 m. by rail WSW. of Madras. Has manufactures of cotton cloths, blankets, brass utensils, earthenware, and jaggery (unrefined sugar); seat of Roman Catholic bishop. Pop. 71,306, increase 4·7 per cent.

Nagpur, 21° 9′ N., 79° 7′ E., capital of the Central Provinces, on a small stream called Nag, 520 m. by rail ENE. of Bombay, is the leading commercial and industrial town of Central India. Has large cotton mills, cotton gins and presses, while the chief home industry is the production of cotton cloths with silk borders and ornamented with gold and silver lace. It is an important educational centre, and is the seat of a Roman Catholic bishop. Pop. 101,415, decrease 20·6 per cent.

Patna, 25° 37′ N., 85° 10′ E., Bengal, on the Ganges, a few miles below its junction with the Son, 332 m. by rail NW. of Calcutta, is the most important trade centre in Bengal after Calcutta. It is one of the two places in India where opium is manufactured; industries include carpets, brocades, embroidery, gold and silver wire, pottery, glass-ware, boots, shoes, and saw mills where the chests for packing opium are made. Has several colleges, and a famous Oriental library. Pop. 136,153, increase 1 per cent.

Peshawar, 34° 1′ N., 71° 35′ E., capital of the North-West Frontier Province, near left bank of the Bara stream, 10 m. from Jamrud fort near the entrance of the Khyber Pass, 1,552 m. by rail NW. of Calcutta, 190 m. by road ESE. of Kabul. It serves as an *entrepôt* for trade for Central Asia, its principal foreign markets being Kabul and Bokhara; chief native industry is the manufacture of bright-coloured scarves called *lungis*. Pop. 97,925, increase 2·9 per cent.

Poona, 18° 31′ N., 73° 51′ E., Bombay, on the Mutha River, 119 m. by rail SE. of Bombay, is the head-quarters of the Bombay Government during the rainy season from June to September. It has cotton mills, iron and brass foundries, paper mills, and native manufactures of cotton and silk fabrics, jewellery, and small articles of ivory. Has many educational institutions; seat of Roman Catholic bishop. Pop. 158,856, increase 3·6 per cent.

Quetta, 30° 10′ N., 67° 1′ E., capital of Baluchistan Agency, 727 m. by rail WSW. of Lahore, 536 m. by rail N. of Karachi, situated in an open plain about 5,500 feet above sea-level, surrounded by a ring of mountains, is a very strong fortress, and one of the most popular stations of the Indian army. It is a trade mart for Afghanistan, and part of Central Asia. Pop. 33,922, increase 38 per cent.

Rampur, 28° 49′ N., 79° 2′ E., capital of native state of Rampur, United Provinces, situated on the Kosi or Kosilla River, 851 m. by rail NW. of

Calcutta, is the chief trading centre in the state, and has native manufactures of pottery, cutlery, and damask. Has a famous Arabic college. Pop. 74,316, decrease 5·6 per cent.

Rangoon, 16° 14′ N., 96° 11′ E., seaport and capital of Burma, situated on the Hlaing or Rangoon River 21 m. from the sea, is the chief port of Burma, about five-sixths of its oversea trade passing through it. It exports rice, timber, and petroleum, and contains rice and saw mills, and petroleum refineries; native industries include famous carving in wood and ivory, and beautiful silver work, mostly embossed bowls. Seat of an Anglican bishop. Pop. 293,316, increase 19·5 per cent.

Rawalpindi, 33° 36′ N., 73° 7′ E., Punjab, situated on the Leh River, 908 m. by rail NNE. of Karachi, contains the most important cantonment in India, and an arsenal. Has locomotive and carriage works of the North-Western Railway, iron foundries, tent factory, and a large transit trade with Kashmir. Pop. 86,483, decrease 1·4 per cent.

Salem, 11° 38′ N., 78° 10′ E., Madras, situated in a picturesque valley watered by the Tirumanimuttar River, 206 m. by rail SW. of Madras, has a large cotton-weaving industry and some manufacture of cutlery. Pop. 59,153, decrease 17·8 per cent.

Shahjahanpur, 27° 53′ N., 79° 54′ E., United Provinces, situated on the River Deoha or Garra, 768 m. by rail NE. of Calcutta, 100 m. by rail N. of Delhi, has manufactures chiefly of sugar and of rum. Pop. 71,778, decrease 6·1 per cent.

Sholapur, 17° 40′ N., 75° 54′ E., Bombay, 250 m. by rail SE. of Bombay, is an important trade centre, and has cotton mills, but its chief industry is the native manufacture of silk and cotton cloth. Pop. 61,345, decrease 18·5 per cent.

Srinagar, 34° 5′ N., 74° 50′ E., capital of the state of Kashmir, situated on both banks of the River Jhelum, 5,250 feet above sea-level, has manufactures of carpets, beautiful silver and copper ware, leather goods, calico printing, wood carving, and the famous *khatamband*, or ceilings, of perfect design, made by piecing together thin slices of pine-wood. Pop. 126,344, increase 3 per cent.

Surat, 21° 12′ N., 72° 50′ E., Bombay, on the Tapti River, 14 m. from its mouth, 167 m. by rail N. of Bombay, has large cotton mills, cotton gins and presses, rice, and paper mills, and native manufactures of fine cotton cloth, some of the finest textures of Gujarat being made here, and silk brocades and embroidery. Pop. 114,863, decrease 3·7 per cent.

Trichinopoly, 10° 49′ N., 78° 42′ E., Madras, on the right bank of the Cauvery River, 250 m. by rail SW. of Madras, has native manufactures of fancy cloths of cotton and silk with borders of silver thread, and cigar factories. An important educational centre, and seat of a Roman Catholic bishop. Pop. 122,028, increase 16·5 per cent.

Umballa, see **Ambala.**

CEYLON

Batticaloa, 7° 44′ N., 81° 52′ E., seaport on the east coast, situated on an island, 69 m. SSE. of Trincomali, is of importance for its haven and the adjacent salt lagoons, and exports rice and coco-nuts. The lagoon is famous for its 'singing fish', supposed to be shell-fish which give forth musical notes. Pop. 10,666, increase 6·99 per cent.

Colombo, 6° 59′ N., 79° 49′ E., seaport and capital of Ceylon, on the west coast of the island, near the mouth of the River Kelani, has one of the finest artificial harbours in the world and is one of the great ports of call of the east. Exports tea and coffee, and has factories for cleaning, preparing, sorting, and packing of coffee. It is an educational centre, and the seat of a Roman Catholic archbishop and of an Anglican bishop. Pop. 211,274, increase 32·5 per cent.

Galle, 6° 1′ N., 80° 12′ E., seaport on the south-west coast 74 m. by rail S. of Colombo, exports tea, coco-nut oil, plumbago, and coir yarn; seat of Roman Catholic bishop. Pop. 39,960, increase 7.52 per cent.

Jaffna, 9° 38′ N., 79° 59′ E., seaport, at the northern extremity of the island, has a trade in tobacco, and in the fibre of the palmyra tree; seat of Roman Catholic bishop. Pop. 40,441, increase 19·43 per cent.

Kandy, 7° 21′ N., 80° 38′ E., situated near the centre of the island, 75 m. by rail ENE. of Colombo, lies round the margin of an artificial lake, 1,718 feet above sea-level, and is surrounded by hills. It is a very beautiful, highland, tropical town, full of interesting historical and Buddhistic associations. Has several educational establishments; seat of Roman Catholic bishop. Pop. 29,927, increase 25·82 per cent.

Trincomali, 8° 36′ N., 81° 12′ E., seaport, on the eastern coast of the island, situated on the north side of the bay of the same name, possesses one of the finest natural harbours in the world; seat of Roman Catholic bishop. Pop. 8,837, decrease 14·34 per cent.

OTHER ASIATIC TERRITORIES

Alor Star, 6° 20′ N., 100° 40′ E., capital of Kedah, one of the protected Malay States, situated on the River Kedah, 10 miles from its mouth, has rice mills. Pop. 20,000.

Bruni, 4° 30′ N., 114° 54′ E., capital of the state of Bruni, Borneo, prettily built over the water on the River Bruni, not far from its mouth, has native manufactures of brass-ware, and cloth embroidered with gold thread. Pop. 15,000. (Also written *Brunei.*)

Georgetown, 5° 24′ N., 100° 21′ E., Straits Settlements, seaport and capital of the island of Penang, situated on a promontory at a point nearest to the mainland, has an excellent harbour, and is a great trade emporium. Pop. (whole island) 141,559.

Kota Bharu, 6° 10′ N., 102° 15′ E., capital of Kelantan, one of the protected Malay States, situated on the right bank of the River Kelantan not far from its mouth, is the commercial centre of the state. Pop. 10,000.

Kuala Lumpor, 3° 12′ N., 101° 53′ E., capital of Selangor and of the whole of the Federated Malay States, situated 27 m. by rail NE. of Port Swettenham, on the Straits of Malacca. Pop. 47,000.

Kuching, 2° 30′ N., 113° E., capital of the state of Sarawak, Borneo, is situated on the Sarawak River, 23 m. from its mouth; seat of an Anglican bishop. Pop. 30,000.

Malacca, 2° 14′ N., 102° 12′ E., Straits Settlements, seaport, situated on the south-western coast of the Malay Peninsula, 118 m. NW. of Singapore; seat of Roman Catholic bishop. Pop. 30,000.

Sandakan, 5° 49′ N., 118° 12′ E., seaport and capital of British North Borneo, situated on Sandakan Bay, in the north-eastern part of the island,

is the chief trading centre of the whole eastern coast, and has large exports of timber. Pop. 9,500.

Seremban, 2° 50′ N., 101° 50′ E., capital of Negri Sembilan, Federated Malay States, is situated 24 m. by rail NE. of Port Dickson or Arang-Arang, the only port in the state. Pop. 30,000.

Singapore, 1° 16′ N., 103° 53′ E., seaport and capital of the Straits Settlements, on an island at the southern extremity of the Malay Peninsula, is situated at the converging point of the great trade routes between Europe and India and the Far East. It is a free port and the principal emporium of trade in south-eastern Asia. It possesses a magnificent harbour, well sheltered and easy of access, and is strongly fortified and provided with an admiralty dockyard. Seat of Anglican bishop. Pop. 303,321.

NOTE TO STATISTICS ON FOLLOWING PAGES

Trade with Principal Countries

Theoretically the imports of one country from another should coincide with the exports of the country from which they purport to be consigned to the importing country; in reality freight, insurance, and other charges, together with the diversion of goods exported when *en route*, and variations in the methods of valuation by Customs authorities, render comparison impracticable.

H.Y. = Highest Year, i.e. the year in which returns were highest during periods for which averages are quoted.

STATISTICS

By Harold Macfarlane

INDIA

Area.—British, 1,092,944 sq. m.; Native States, 709,118 sq. m.; total, 1,802,112 sq. m.; i. e. 14·95 times the area of the United Kingdom.

AREA OF CHIEF ADMINISTRATIONS (Million Acres)

	Area (Survey).	*Net Area.*[1]	*Net Area cropped.*	*Current fallows.*	*% cultivated.*	*Forests.*
Madras	97·45	91·07	33·75	8·4	46·0	12·87
Bengal	93·2	74·02	36·66	5·46	57·0	6·28
Punjab	86·7	62·2	24·8	3·7	45·8	3·3
Bombay	85·6	48·6	25·35	7·53	67·0	7·54
Central Prov.	72·5	52·6	17·74	2·28	38·0	15·12
Upper Burma	57·8	53·8	4·7	4·2	1·6	11·76
United Prov. (Agra)	57·37	53·0	26·92	2·14	54·0	8·7
Lower Burma	54·988	54·988	8·6	0·73	1·7	6·8
Assam	39·275	31·3	5·56	2·58	2·6	2·35
Sind	34·12	30·25	4·11	5·06	3·0	0·78
Eastern Bengal	31·4	28·8	15·4	2·68	62·7	1·36
United Provinces	15·3	15·3	9·3	0·56	64·4	0·61
Berar	11·3	11·3	7·18	0·86	71·0	2·24
NW. Frontier Prov.	8·578	8·4	2·4	0·46	34·0	0·37
Ajmer-Merwara	1·77	1·77	0·36	0·12	26·0	0·09
Coorg	1·01	1·01	0·14	0·15	28·0	0·35

[1] Feudatory and Tributary States being deducted.

WHEAT PRODUCTION IN INDIA (inclu. certain Native States) Av. 1909–10 to 1911–12 (1,000 tons)

Punjab, 3,619 (37% of total); Un. Prov. of Agra and Oudh, 2,975 (30·2%); Central Prov. and Berar, 943 (9·6%); Cent. India, 625 (6·3%); Bengal, Bihar, and Orissa, 591 (6·0%); Bombay, 389 (3·9%); NW. Frontier, 260 (2·6%); Rajputana, 248 (2·5%); Sind, 121 (1·2%); Hyderabad, 69 (0·7%); Mysore, 0·5. Total, 9,840·5.

Between 1901 and 1911 there was an incr. of 7 mill. ac. in the wheat area or 30·2%, as against an inc. in pop. of 5·3%. Av. yield per ac. 11½ bush. (U.K. 33).

RICE PRODUCTION IN BRIT. INDIA. Av. 1909–10 to 1911–12 (1,000 tons)

Bengal, 13,918 (51% of total); E. Bengal and Assam, 7,336 (27%); Lower Burma, 3,016 (11%); Madras, 2,979 (11%). Total, 27,249.

LIVE STOCK

Exclusive of E. Bengal the live stock in Brit. India during the period 1909–11 was as follows: cattle (except calves), bulls and bullocks, 40,000,000 (164 per 1,000 inhab. of Brit. territory); cows, 31,226,000 (128 per 1,000); buffaloes (except calves), bulls, 4,558,000 (18 per 1,000); cows, 12,052,000 (49 per 1,000); calves and buffalo calves, 30,356,000 (124 per 1,000); sheep, 22,234,000 (91 per 1,000); goats, 31,098,000 (127 per 1,000); horses and ponies, 1,524,000 (6 per 1,000); mules and asses, 1,435,000 (5 per 1,000); camels, 445,000 (2 per 1,000).

AGRICULTURAL STATISTICS OF BRITISH INDIA

1910–11. Net area by professional survey, 618·6 mill. ac.; area under forest, 80·6 mill. ac.; not available for cultivation, 150·0 mill. ac.; cultivable waste other than fallow, 115·0 mill. ac.; fallow land, 46·95 mill. ac. Net area (total area cropped less area cropped more than once) sown with crops, 223·0 mill. ac.; area irrigated, 40·9.

Av. 1906–7 *to* 1910–11. *Area under:*	*Mill. ac.*	*% of total area cult.*	*Production.* 1,000.
Rice	75·9	31·2	23,130 (tons)
Wheat	22·4	9·1	8,360 (tons)
Jawar (great millet)	22·1	9·0	
Bajra (spiked millet)	15·6	6·3	
Grain (pulse)	11·72	4·7	
Barley	7·84	3·2	not available
Maize	6·5	2·6	
Ragi (millet)	4·3	1·7	
Other grains and pulse	30·86	12·3	
Total food grains	197·22	80·1	
Other food crops (inclu. gardens, orchards, spices)	7·38	3·0	not available
Sugar	2·56	1·0	2,093 (tons)
Coffee	0·096	0·04	28,300 (lb.)
Tea	0·516	0·2	251,080 (lb.)
Linseed	2·1	0·85	375·4 (tons)
Sesamum (til.)	4·26	1·7	472·6 (tons)
Rape and mustard	3·88	1·575	1,036 (tons)
Other oilseeds	3·88	1·575	—
Total oilseeds	14·12	5·70	
Cotton	13·66	5·5	4,420 (400 lb. bales)
Fodder crops	4·72	1·9	—
Jute	3·14	1·27	8,080 (400 lb. bales)
Tobacco	1·0	0·4	—
Other fibre crops	0·75	0·3	—
Opium	0·465	0·18	—
Indigo	0·344	0·14	48·2 (cwt.)

FORESTRY (Area sq. m.)

Province.	*Area of prov.*	*Area of lands under For. Dept.*	*% of forest to total area.*
Burma	169,989	137,227	80·7
E. Bengal and Assam	93,906	28,905	30·7
Cent. Prov. and Berar	99,874	21,384	21·4
Madras	142,298	20,030	14·0
Bombay	123,235	12,379	10·0
Punjab	97,211	8,733	8·9
Bengal	115,664	7,011	6·0
United Prov.	106,773	4,174	3·9
Andamans	3,143	1,952	62·1
Baluchistan	46,656	785	1·6
Coorg	1,582	520	32·8
NW. Frontier Prov.	13,184	236	1·8
Ajmer-Merwara	2,767	142	5·1
Total	1,016,282	243,478	23·9

The output of produce during the period 1907–11 averaged 238,000,000 cu. ft. of timber and fuel and minor produce, valued at £554,000. The av. gross rev. of the Dept. during this period was £1,750,000, and the av. expend. £980,000, leaving an av. surplus of £770,000. The chief rev.-producing provinces are Burma (36% of total), Madras (14%), Bombay (13·5%), Un. Prov. (8·6%), Cent. Prov. and Berar (7%), and E. Bengal and Assam (6·9%).

MINERALS. CHIEF PRODUCING PROVINCES (Av. 1906–10 INCLUSIVE)

	£1,000.	% *of total.*	*H. Y.*	£1,000.
Bengal	2,601	34·02	1908	3,107
Native States	2,485	32·5	1906	2,544
Burma	1,197	15·65	1909	1,811
Central Prov.	566	7·4	1907	738
Madras	298	3·89	1910	360
Punjab	167	2·18	1910	269
Bombay	137	1·79	1908	159
Assam	106	1·39	1910	116
Other Provinces	90	1·18	1908	291
	7,647	100·0	1909	8,263

PRODUCTION BY PROVINCES (Av. of Five Years 1907–11)

Coal (H. Y. 1908)	1,000 *tons.*	*Value* £1,000.	% *of total value.*	*H. Y.* £1,000.
Bengal	10,894·0	2,310·0	84·6	2,925·5
Hyderabad	463·0	190·0	7·0	185·0
E. Bengal and Assam	294·0	93·0	3·4	87·0
Central Prov.	204·0	49·0	1·8	68·0
Central India	146·0	33·0	1·2	37·0
Baluchistan	48·0	31·0	1·13	25·0
Punjab	46·6	20·5	0·75	24·0
Rajputana	17·4	3·5	0·12	4·6
	12,113·0	2,730·0	100·0	3,356·1
Salt (H. Y. 1910)				
Madras	395	140·0	30·93	165
Northern India	381	121·0	26·74	180
Bombay and Sind	453	106·0	23·42	120
Burma	27	85·6	18·91	74
	1,256	452·6	100·0	539
Manganese Ore (H. Y. 1907)				
Central Prov.	475	659·0	70·69	1,314
Madras	133	122·0	13·09	243
Mysore	57	69·4	7·45	204
Bombay	28	33·4	3·58	47
Bengal	29	29·4	3·15	5
Central India	16	19·0	2·04	61
	738	932·2	100·0	1,874
Gold (H. Y. 1911)				
Mysore (1,000 oz.)	544·0	2,086	95·2	2,130
Elsewhere (1,000 oz.)	27·6	105	4·8	108
	571·6	2,191	100·0	2,238
Petroleum (H. Y. 1909)				
Burma (mill. gal.)	197·3	777·4	93·4	899
Assam (mill. gal.)	3·3	54·6	6·6	11
	200·6	832·0	100·0	910
Jadestone, Av. Exp. (H. Y. 1910)				
Burma (1,000 cwt.)	4·36	75·93	—	99·6
Rubies (H. Y. 1907)				
Burma (1,000 carats)	271·66	64·8	—	95·1
Mica, Av. Exp. (H. Y. 1907)				
Bengal (1,000 cwt.)	30·26	145·6	80·3	169·8
Madras (1,000 cwt.)	7·32	33·4	18·4	55·5
Bombay (1,000 cwt.)	0·51	2·36	1·3	2·9
	38·09	181·36	100·0	228·2

BRITISH INDIA FACTORIES. Av. 1907–11

	No.	*Persons employed.* 1,000.		*No.*	*Persons employed.* 1,000.
Cotton mills	212	211·0	Tile factories	96	15·5
Jute mills	54	205·0	Dockyards	20	14·5
Railway workshops	88	92·2	Lac factories	115	12·0
Cotton factories	1,110	84·0	Silk filatures	62	10·2
Indigo factories	136	55·8	Saw mills	101	9·1
Jute presses	154	28·7	Petroleum refineries	6	7·6
Iron and brass foundries	84	25·3	Sugar factories	23	5·3
Printing presses	102	25·0	Paper mills	8	4·6
Rice mills	195	18·6	Woollen mills	4	3·2
Arms and ammunit.	16	16·6	Breweries	24	1·7

The av. no. of factories inspected under the Factory Act during the above period was 2,011; men employed 595,000, women 109,000, children 49,400, total 753,400. Of the total hands employed daily Bengal claims 38%, Bombay 29%, Madras 6·8%, and Un. Prov. 6·4%.

RAILWAYS. Total mileage 32,839. Total capital outlay £300,000,000, i.e. £9,136 per mile. Av. gross earnings (1907–11) £32,746,000 (1911, £36,853,000). Working expenses £17,820,000 (1911, £19,226,000). Net earnings £14,926,000 (1911, £17,627,000). Percentage of net earnings on av. capital outlay 5·27 (1911, 5·87). Percentage of working expenses to gross earnings 54·4 (1911, 52·17). Net earnings per mile open £475 (1911, £537). Av. no. of passengers 343·4 mill. (1911, 389·9 mill.). Av. weight of goods carried 64·5 mill. tons (1911, 71·3 mill. tons). Railway staff: Europeans 7,380 (1911, 7,699), Anglo-Indians 9,820 (1911, 9,877), Indians 516,000 (1911, 545,454), total 533,200 (1911, 563,030).

SHIPPING

Av. of years.	1,000 *tons.*	*H.Y.*	1,000 *tons.*	*British (av.)* 1,000 *tons.*	*% of total.*	*British. Sailing.* 1,000 *tons.*	*Steam.* 1,000 *tons.*
1897–1901	8,688	1901	9,625	7,272	83·7	696	6,576
1902–7	12,748	1904	13,881	10,502	82·37	369	10,133
1907–11	14,671	1911	16,616	11,825	80·5	232	11,593

NATIONALITY OF SHIPPING. OVER-SEAS TRADE. AV. 1906–7 TO 1910–11

	1,000 *tons.*	*% of total.*	*H. Y.*, 1910–11. 1,000 *tons.*	*% of total.*
U. K.	10,914	77·4	11,715	78·1
Brit. India	396	2·8	351	2·3
Total Brit. Emp.	11,456	81·2	12,204	81·3
Foreign countries:				
Germany	1,122	8·0	1,215	8·1
Austro-Hun.	537	3·8	611	4·0
Japan	240	1·7	237	1·6
Italy	216	1·5	225	1·5
Total For. co.	2,646	18·8	2,790	18·7

Av no. of vessels built (1906–10) 124, tonnage 5,626; 1910, 98 vessels, 4,691 tons. *Av. no. of vessels on register* 185, tonnage 16,480; 1910, 124, tonnage 10,393.

Ports. Chief ports, av. 1907–11, Bombay, 3,334,000; Calcutta, 3,279,000 tons. The av. annual distribution of trade in private merchandise, 1907–11, imports and exports, was as follows: Calcutta 79·5 mill. £, Bombay 62 mill., Karachi 18·6 mill., Rangoon 15·8 mill., Madras 9·8 mill., and Chittagong 3·25 mill.

FINANCE. PROGRESS OF REVENUE. (In millions sterling)

	Land.	*Opium.*	*Public works.*	*Total Rev.*
1890–1 . . .	16·0	5·25	13·3	57·0
1900–1 . . .	17·48	5·1	12·59	64·7
1910–11 . . .	20·88	7·52	17·87	80·68

EXPENDITURE	*Cost of collection.*	*Civil admin.*	*Military.*	*Public works.*	*Total.*
1890–1 . . .	6·35	8·92	14·12	17·64	54·66
1900–1 . . .	7·5	9·52	16·37	14·09	63·05
1910–11 . . .	8·86	14·93	20·49	19·51	76·75

	REVENUE			EXPENDITURE		
Av. of years.	£1,000.	*H.Y.*	£1,000.	£1,000.	*H.Y.*	£1,000.
1897–1901	69,900	1901	76,344	68,160	1900	73,602
1902–6	80,800	1905	84,998	78,200	1905	82,905
1907–11	75,760*	1911	82,694	74,740†	1911	78,787

* After 1906 the transactions of local bodies, previously included, are excluded from the account, while net earnings of the State Railways alone have been included in place of the gross receipts as formerly when working expenses were entered under expenditure.

† Working expenditure of State Railways omitted from 1906 onward.

Debt.—The amount of debt and obligations of the Gov. of India in 1901 was 226 mill., in 1911 the total was 303·4 mill., the av. for 1907–11 being 287·5 mill. st.

Defence.—The established strength of European and native armies in Brit. India (1911–12) comprised (1) European army: infantry, 53,746; royal artillery, 15,773; cavalry, 5,634; royal engineers, 306; commissioned officers for Indian army attached to Brit. Reg., 91. Total, 75,500. (2) Native army: infantry, 120,675; cavalry, 24,556; artillery, 10,051; sappers and miners, 5,137; bodyguards, 350. Total, 160,769.

In addition to the above there are also 22,394 imperial service (native) troops, 34,624 native reservists, and 42,764 volunteers (British).

POST OFFICE SAVINGS BANK. (* Interest included.)

	Number of depositors.			*Deposits*	*Withdrawals*	*Balance of*
	European.	*Native.*	*Total.*	*each year.**	*each year.*	*deposits.**
	1,000.	1,000.	1,000.	£1,000.	£1,000.	£1,000.
1901–2	80·0	786·7	866·7	2,976	2,550	7,121
1910–11	127·9	1,302·5	1,430·4	4,336	3,635	11,279
Av. 1907–11	116·3	1,199·8	1,316·1	4,005	3,612	10,385

IMPORTS AND EXPORTS. GENERAL PROGRESS

IMPORTS BY SEA. (*Millions Sterling.*)

	Merchandise.					
	Cotton goods.	*Other goods.*	*Total.*	*Treasure.*	*Total.*	*Increase %*
1890–1	20·66	27·31	47·97	14·63	62·60	—
1900–1	19·91	34·02	53·93	16·38	70·31	12·3
1910–11	29·92	59·22	89·14	26·51	115·65	64·4

EXPORTS BY SEA. (*Millions Sterling.*)

	Merchandise.						*Total*	*Trea-*		*Incr.*
	Grain.	*Cotton.*	*Jute.*	*Seeds.*	*Opium.*	*Tea.*	*Merchand.*	*sure.*	*Total.*	*%*
1890–1	13·0	17·35	6·72	6·2	6·1	3·6	66·8	1·4	68·2	—
1900–1	9·38	11·39	12·49	6·0	6·3	6·45	71·8	9·49	81·3	19
1910–11	25·73	32·45	21·66	16·75	8·51	8·31	140·11	4·75	144·86	78

PRINCIPAL ARTICLES. IMPORTS AND EXPORTS, AVERAGE, 1907–11

IMPORTS BY SEA

	£1,000.	% of total.	H.Y. 1911. £1,000.
Cotton*	29,800	27·0	34,400
Gold	16,480	15·0	27,662
Silver	8,328	7·5	7,952
Sugar	7,780	7·0	7,955
Railway materials	3,820	3·5	2,958
Machinery	3,640	3·3	2,838
Iron	3,360	3·0	3,671
Steel	2,940	2·7	3,045
Hardware and cutlery	2,040	1·8	2,305
Provisions	1,980	1·8	2,167
Copper and brass	1,920	1·7	1,918
Oil: kerosene	1,880	1·7	2,167

IMPORTS BY LAND

Grain and pulse	1,200	23·0	1,274
Timber	384	7·4	364
Wool, raw	361	6·9	381
Butter (Ghi)	350	6·7	437
Oilseeds	324	6·2	391
Fruits, veg., and nuts	306	5·8	380

EXPORTS BY SEA

	£1,000.	% of total.	H.Y. 1911. £1,000.
Cotton*	27,240	20·5	27,428
Rice	14,260	10·7	19,370
Seeds	13,220	9·9	17,960
Jute, raw	12,096	9·1	15,038
Jute, manufac.	11,220	8·4	10,671
Hides and skins	8,520	6·4	9,286
Tea	7,740	5·8	8,649
Opium	7,080	5·3	8,726
Wheat	6,520	4·9	8,899
Gold	2,420	1·8	2,484
Silver	2,280	1·6	4,423
Raw wool	1,740	1·3	1,974

EXPORTS BY LAND

Cotton articles	2,254	52·0	2,606
Provisions	210	4·8	283
Spices	177	4·0	238
Salt	155	3·5	180
Grain and pulse	126	2·9	198
Iron	100	2·3	183

* Raw, twist, and manufactured.

TRADE WITH PRINCIPAL COUNTRIES. AVERAGE, 1907–11

IMPORTS BY SEA[1]

	£1,000.	% of total.	H.Y. 1911. £1,000.
United Kingdom	72,650	63·2	79,771
Australia	4,840	4·2	9,726
Straits Settlements	2,260	1·9	2,261
Mauritius and Seychelles	1,720	1·5	1,277
Total Brit. Emp.	84,768	73·8	95,734
Germany	5,186	4·5	6,003
Java	5,120	4·4	6,314
Egypt	3,420	2·9	5,620
United States	2,600	2·3	3,544
Austria-Hungary	1,920	1·7	1,781
Japan	1,820	1·6	2,318
France	1,720	1·5	2,099
China	1,600	1·4	1,469
Belgium	1,460	1·3	1,557
Total For. Coun.	30,112	26·2	35,950
Grand Total	114,880	100·0	131,684

IMPORTS BY LAND

Nepal	2,361	45·1	2,912
N. Shan States	631	12·0	709
Afghanistan	613	11·7	636
Dir, Swat, and Bajaur	512	9·8	475
S. Shan States	353	6·7	466
Tibet	147	2·8	174
Total Imp. by Land	5,231	100·0	6,233

EXPORTS BY SEA[1]

	£1,000.	% of total.	H.Y. 1911. £1,000.
United Kingdom	34,826	26·3	42,332
Hong Kong	6,460	4·8	5,507
Ceylon	5,100	3·8	5,987
Str. Settlements	4,840	3·6	5,923
Australia	1,800	1·3	1,857
Aden	1,340	1·0	1,793
Total Brit. Emp.	57,755	43·6	67,268
Germany	12,900	9·7	15,106
United States	9,420	7·1	10,444
France	8,120	6·1	9,176
Japan	7,860	5·9	11,163
Belgium	6,600	5·0	8,905
China	6,480	4·9	10,071
Austria-Hungary	4,340	3·2	5,076
Italy	4,180	3·1	4,225
Total For. Co.	74,540	56·4	91,640
Grand Total	132,295	100·0	158,908

EXPORTS BY LAND

Nepal	1,148	26·3	1,475
Afghanistan	797	18·2	843
N. Shan States	518	11·9	676
S. Shan States	495	11·3	508
Dir, Swat, and Bajaur	458	10·5	487
Tot. Exp. by Land	4,366	100·0	5,273

[1] Imports are classified according to countries of consignment, exports according to countries of final destination.

CHIEF ARTICLES IMPORTED. AV. 1906–7 TO 1910–11. £1,000.

From *U. K.* Cotton goods, 26,327; machinery and mill-work, 3,566; metals, iron, 2,584; railway plant and rolling-stock, 3,550.
Mauritius. Sugar, 1,660.
Straits Settlements. Betel nuts, 516.
Austria-Hungary. Sugar, 736; glass and ware, 325.
Belgium. Steel, 1,057; dyes, 473.
France. Apparel, 256; liquors, 228.
Germany. Metals, 599; woollen art., 495; hardware and cutlery, 297.
Holland. Cotton manu., 408·4.
Italy. Cotton manu., 204.
Japan. Cotton hosiery, 280; silk manu., 642.
Java. Sugar, 4,160.
Sweden. Matches, 138·2.
United States. Mineral oils, 1,208.

CHIEF ARTICLES EXPORTED. AV. 1906–7 TO 1910–11. £1,000

To *U. K.* Hides and skins, 2,754; raw jute, 5,214; tea, 5,426; wheat, 4,902.
Australia. Jute bags and cloth, 1,170.
Ceylon. Rice, 2,470.
Mauritius. Rice, 450.
Straits Settlements. Opium, 1,252; rice, 1,326.
China, Hong Kong. Cotton, twist, and yarn, 2,300; opium, 3,540.
China, Treaty Ports, cotton, twist, and yarn, 3,060; opium, 1,440.
Egypt. Rice, 470.
Argentina. Gunny cloth, 1,214.
Austro-Hun. Raw cotton, 1,371; hides and skins, 589; indigo, 702.
Belgium. Raw cotton, 2,314; linseed, 373; rape, 813; wheat, 408.
Chile. Gunny bags, 403.
France. Raw cotton, 1,160; jute, 1,490; ground nuts, 1,020; til, 663.
Germany. Raw cotton, 3,060; hides and skins, 1,436; raw jute, 2,780; rice, 1,842.
Holland. Rice, 1,034.
Italy. Raw cotton, 2,094; hides and skins, 544; jute, 574.
Japan. Raw cotton, 5,850.
Java. Rice, 770.
Russia. Tea, 504.
Spain. Raw Cotton, 336.
United States. Hides, skins, 2,156; Gunny cloth, 3,600.

POPULATION

	British India.	*Increase.*	*Native Sta. and Agencies.*	*Variation.*	*Grand total.*	*Variation.*
	Total.	%	*Total.*	%	*India.*	%
1881	199,199,458	—	54,696,872	—	253,896,330	—
1891	221,376,957	11·2	65,937,714	+20·1	287,314,671	+13·2
1901	231,605,940	4·7	62,755,116	− 5·0	294,361,056	+ 2·5
1911	244,267,542	5·5	70,864,995	+12·9	315,132,537	+ 7·1

Pop. per sq. m.: British territory 222·5, native states 104·9, all India 177·7.

EMIGRATION OF COOLIES FROM INDIAN PORTS (AVERAGE OF FIVE YEARS, 1906–7 TO 1910–11)

From:	To: *Mauritius.*	*Natal.*	*British Guiana.*	*Brit. W. Indies.*	*Fiji.*	*Mombasa.*	*Total Emigration.*
Calcutta . .	348	1,278	2,130	2,854	1,710	—	9,540
Madras . .	—	4,248	—	250	520	—	5,018
Bombay & Karachi	—	—	—	—	—	310	449
Total .	348	5,526	2,130	3,104	2,230	310	15,007
1900–1. Total .	2,229	6,312	3,932	2,450	2,553	8,032	25,508
1910–11. Total .	533	6,257	2,173	4,075	1,898	127	15,439

Number of emigrants returned to India, average 1907–11, 7,117.

TOTAL POPULATION BY PROVINCES, STATES, AND AGENCIES

Provinces.	1911. Males. 1,000.	1911. Females. 1,000.	1911. Total.	Variations. 1901–11. %	Variations. 1891–1901. %	Variations. 1881–91. %
1. Ajmer Merwara	266·2	235·2	501,395	+ 5·1	— 12·1	+ 17·7
2. Andamans and Nicobars	19·5	6·9	26,459	+ 7·3	+ 57·9	+ 6·7
3. Baluchistan	239·1	175·2	414,412	+ 8·5	—	—
4. Bengal	26,278·8	26,389·4	52,668,269	+ 3·8	+ 2·8	+ 5·5
5. Bombay (Presidency)	10,245·8	9,426·8	19,672,642	+ 6·0	— 1·7	+ 14·5
Bombay	8,275·2	7,837·8	16,113,042	+ 5·3	— 4·1	+ 13·6
Sind	1,939·3	1,574·1	3,513,435	+ 9·4	+ 11·7	+ 18·9
Aden	31·3	14·8	46,165	+ 5·0	— ·2	+ 26·4
6. Burma	6,183·5	5,931·7	12,115,217	+ 15·5	+ 35·9	+ 106·6
7. Cent. Prov. and Berar	6,930·4	6,985·9	13,916,308	+ 16·2	— 8·3	+ 9·3
8. Coorg	97·2	77·7	174,976	— 3·1	+ 4·4	— 2·9
9. E. Bengal and Assam	17,413·9	16,604·6	34,018,527	+ 11·5	+ 8·5	+ 10·4
10. Madras	20,382·9	21,022·4	41,405,404	+ 8·3	+ 7·3	+ 15·6
11. NW. Frontier Prov.*	1,182·1	1,014·8	2,196,933	+ 7·6	+ 9·9	+ 17·9
12. Punjab	10,992·0	8,982·9	19,974,956	— 1·7	+ 6·9	+ 10·0
13. United Prov.	24,641·8	22,540·2	47,182,044	— 1·1	+ 1·7	+ 6·2
Agra	18,157·1	16,466·9	34,624,040	— ·7	+ 1·8	+ 4·6
Oudh	6,484·7	6,073·3	12,558,004	— 2·1	+ 1·4	+ 11·1
Total Brit. Terr.	124,873·7	119,393·8	244,267,542	+ 5·5	+ 4·7	+ 11·2
14. Baluchistan States	214·4	182·0	396,432	— 7·5	—	—
15. Baroda State	1,055·9	976·8	2,032,798	+ 4·1	— 19·2	+ 10·7
16. Bengal States	2,271·6	2,266·5	4,538,161	+ 16·9	+ 7·6	+ 19·7
17. Bombay States	3,765·4	3,646·2	7,411,675	+ 7·3	— 14·5	+ 16·5
18. Cent. India Agency	4,801·4	4,555·5	9,356,980	+ 10·1	— 16·2	+ 9·4
19. Cent. Prov. States	1,053·6	1,063·4	2,117,002	+ 29·8	— 4·8	+ 23·4
20. E. Bengal and Assam States	292·5	283·3	575,835	+ 25·8	+ 233·1	— 56·6
21. Hyderabad State	6,797·1	6,577·5	13,374,676	+ 20	— 3·4	+ 17·2
22. Kashmir State	1,674·3	1,483·7	3,158,126	+ 8·7	+ 14·2	—
23. Madras States	2,411·7	2,400·1	4,811,841	+ 14·9	+ 13·2	+ 10·6
Cochin State	457·3	460·7	918,110	+ 13·1	+ 12·3	+ 20·4
Travancore State	1,731·3	1,697·6	3,428,975	+ 16·2	+ 15·4	+ 6·5
24. Mysore State	2,934·6	2,871·5	5,806,193	+ 4·8	+ 12·1	+ 18·1
25. NW. Fron. Prov.†	864·8	757·2	1,622,094	+ 1,831·9	—	—
26. Punjab States	2,322·9	1,889·8	4,212,794	— 4·8	+ 3·8	+ 10·4
27. Rajputana Agency	5,515·3	5,015·1	10,530,432	+ 6·9	— 19·0	+ 22·5
28. Sikkim	45·0	42·8	87,920	+ 49·0	+ 93·8	—
29. United Provinces	431·4	400·6	832,036	+ 3·7	+ 1·2	+ 6·8
Total, Native States	36,452·4	34,412·5	70,864,995	+ 12·9	— 5·0	+ 20·1
Grand total, India	161,326·1	153,806·4	315,132,537	+ 7·1	+ 2·5	+ 13·2

* Districts and administered territories.
† Agencies and tribal areas.

Vital Statistics. Per 1,000 of population. Av. 1906–10. Births, 37·378; deaths, 34·846, i.e. male, 18·014; female, 16·883.

Death-rate according to class: Christians, 21·906; Hindus, 34·854; Muhammadans, 35·132; Buddhists, 29·846; others, 45·066.

The av. death-rate according to administrations is as follows: Punjab, 42·79; United Provinces, 42·25; Ajmer-Merwara, 40·58; Central Provinces and Berar, 40·25; Bengal, 35·2; Coorg, 33·05; Eastern Bengal and Assam, 31·86; North-west Frontier, 31·62; Bombay, 30·54; Burma, 27·99; and Madras, 24·9.

RELIGIONS

	British Territory. 1,000.	*Native States.* 1,000.	*Total.* 1,000.	*% of grand total.*
Hindus	163,621·5	53,965·5	217,587·0	69·42
Muhammadans	57,423·9	9,199·5	66,623·4	21·25
Buddhists	10,644·4	77·0	10,721·4	3·42
Animistic	7,348·0	2,947·0	10,295·0	3·28
Christians	2,492·0	1,384·0	3,876·0	1·23
Sikhs	2,172·0	842·5	3,014·5	0·96
Jains	458·6	789·6	1,248·2	0·40
Parsis	86·0	14·0	100·0	0·03
Other Religions*	20·8	37·2	58·0	0·01
				100·00

* Religious statistics were not compiled in the case of 1,608,556 persons in the North-west Frontier Province.

So far as Christians are concerned 199,776 are of European and allied races, 101,657 Anglo-Indians, and 3,574,770 natives. With respect to denominations, Roman Catholics comprise 39 % of the whole, Anglicans 12·6 %; Romo-Syrians 10·6 %; Baptists 8·6 %; Syrian (Jacobites and others) 8 %; Lutherans 5·6 %; Presbyterians 4·6 %; Methodists 4·4 %; Congregationalists 3·4 %; and Salvationists 1·3 %.

BALUCHISTAN

Area.—134,638 sq. m., i.e. about 11 % greater than the area of the U. K.

Minerals.—Coal, av. 1908–11, 41,370 tons (1911, 50,000). Coal dust, 9,415 tons (1911, 68). Chromite ore, av. amount raised 1907–11, 4,224 tons.

Imports and Exports.—*Imports* (av. 1908–9—1911–12)—Indian Land Trade, £1,204,000; Afghanistan, £49,460; Persia, £23,180; Maritime Trade, £72,800. Total, £1,349,440. *Exports*—Indian Land Trade, £743,158; Afghanistan, £35,745; Persia, £66,480; Maritime Trade, £9,776. Total, £855,159.

Chief Imports.—From Afghanistan: fruit, £9,100 (1911–12, £9,300); ghi, £5,000 (1911–12, £4,000). From Persia: silk manufact., £7,700 (1911–12, £3,660); wool, £5,200 (1911, £6,000); drugs and medicines, £5,800 (1911, £6,600).

Chief Exports.—To Afghanistan: cotton manufact., £20,000 (1911–12, £6,100). To Persia: leather goods, £21,300 (1911–12, £35,000); cotton piece goods, £21,000 (1911–12, £34,000); dyeing materials, £11,700 (1911–12, £8,000).

Population (Census, 1911), 834,703, i.e. 6·2 per sq. m.

Religion (per 100 of pop.), Mussulman, 93·71; Hindus, 4·52; Sikhs, 1·01; Christians, 0·61; others, 0·15.

Finance.—Revenue, av. 1908–9—1911–12, £157,000 (1911–12, £169,000).

Expenditure.—£276,300 (1911, £282,000).

SIKKIM

Area.—2,818 sq. m., i.e. about the size of Sussex and Kent.

Imports and Exports.—*Imports*, av. 1907–8—1911–12, £60,000 (1911–12, £73,900). *Exports*. Av. 1907–8—1911–12, £68,500 (1911–12, £86,000).

Population (1911), males, 45,246; females, 43,002. Total, 88,248. Increase per cent., 1901–11, 49·4; males per 1,000 females, 1,052; density of population, 31·32 per sq. m.

Religions.—Hindus, 58,824; Buddhists, 29,092; Christians, 286; Mussulman, 45; others, 1.

Finance.—Total receipts, av. 1908–9—1911–12, £13,250 (1911–12, £14,500). Total expenditure, £13,400 (1911–12, £14,300).

ADEN (INCLUDING PERIM)

Area.—Aden, 75 sq. m. Perim, 5 sq. m.

SHIPPING (INCLUDING NATIVE CRAFT)

				British vessels.	
Av. of years.	1,000 *tons.*	*H.Y.*	1,000 *tons.*	1,000 *tons.*	% *of total.*
1897–1901	5,020	1898	5,356	3,080	61·3
1902–6	5,860	1906	6,350	3,300	56·3
1907–11	6,620	1911	7,247	3,560	53·7

Excluding native craft the av. net tonnage entered and cleared at the port of Aden was (1907–11) 6·5 mill. tons. (Highest year, 1911, 7·2 mill.)

Minerals.—The output of salt (1906–10) was 75,000 tons, valued at £30,000. (Highest year, 1907, 90,400 tons, £35,900.)

IMPORTS

Av. of years.	*Total Imports.* £1,000.	*Bullion & Specie.* £1,000.	*Merchandise.* £1,000.	*H.Y.*	£1,000.	*Av. imp. from U.K.* £1,000.	%
1897–1901	2,960	271·6	2,688·4	1901	3,337	318	10·7
1902–6	3,580	382·0	3,198·0	1903	3,867	313	8·7
1907–11	3,640	526·1	3,113·9	1911	4,343	348	9·5
			EXPORTS				
1897–1901	2,460	270	2,190	1901	2,788	161·6	6·5
1902–6	2,960	353	2,607	1905	3,107	164·6	5·5
1907–11	3,240	551	2,689	1911	3,909	200·6	6·1

Population.—1881, 34,860; 1891, 44,079; 1901, 43,974; 1911, 46,165. Males, 31,290; females, 14,875, i.e. 2,104 males per 1,000 females. Increase 1901–11, 4%. Population per sq. m. 577.

BAHREIN ISLANDS

Bahrein, the largest island, is 27 m. long by 10 m. wide; Muharek, 4 m. by ½ m.; Sitra, 3 m. by 1 m.; Nabi Saleh, 2 m. in circumference.

Shipping (total tonnage entered and cleared at the port of Bahrein).—Av., 1908–9 to 1910–11. Entered, 191,000 (1910–11, 228,500); cleared, 94,300 (1910–11, 96,600). Total, 285,300. British, entered, 139,000 (1910–11, 169,600); cleared, 62,000. (1910–11, 64,000). Total, 201,000 (70·46 % of total). German, entered, 21,000 (1910–11, 25,000); cleared, 8,000 (1910–11, 5,000). Total, 29,000 (10·16 %).

Imports (av. 1907–8 to 1911–12), £1,509,800. Highest year, 1911–12, £2,065,000. *Exports* (av. 1907–8 to 1911–12), £1,309,000. Highest year, 1911–12, £2,284,000.

PRINCIPAL ARTICLES IMPORTED AND EXPORTED. AV. OF YEARS 1908–9 TO 1910–11

IMPORTS.	£1,000.	% of total.	H.Y. 1909–10. £1,000.	EXPORTS.	£1,000.	% of total.	H.Y. 1910–11. £1,000.
Specie	458·6	30·84	716·6	Pearls	676·6	64·19	928·5
Pearls	319·5	21·48	420·0	Specie	139·9	13·27	180·2
Rice	198·9	13·38	207·0	Rice	50·6	4·80	55·4
Piece goods	90·25	6·07	126·4	Piece goods	34·0	3·22	31·3
Dates	49·9	3·36	62·3	Dates	30·4	2·88	24·3

Population (approx.) 90,000. Chief town, Manameh, 25,000.

CEYLON

Area.—25,332 sq. m., i.e. 20·92 % of area of U. K. *Provinces.*—Western, 1,432 sq. m.; Central, 2,287¼; Northern, 3,370; Southern, 2,146¼; Eastern, 3,848¼; N. Western, 3,016; N. Central, 4,068; Province of Uva, 3,271½; Sabaragamuwa, 1,892¾.

Agriculture.—Area under cultivation, in thousands of acres: (1871) 1,402·5, (1881) 2,506·4, (1891) 2,025, (1901) 2,248, (1911) 2,754·8. Average area under cultivation (1907–11), 2,753,000 acres.

Chief crops.—Coco-nuts, 975,000 acres (35 % total area); paddy (rice), 672,000 acres (24·4 %); tea, 514,000 acres (18·7 %); rubber, 134,000 acres (4·9 %); other grain crops, 112,000 acres (4 %); fruit, 100,800 acres (3·6 %); cacao, 39,200 acres (1·4 %).

In 1910–11, when the total area under cultivation was 2·75 mill. ac., including 781,200 ac. with grain of all kinds, 651,400 with fruit and vegetables, and 1·3 mill. with other crops, it was estimated that the following areas, though not cultivated, were fit for cultivation, viz. 798,000 ac. for grain, 286,000 ac. for fruit and vegetables, and 303,000 ac. for other products. Moreover, it was asserted, a further area could be rendered fit for cultivation comprising 1·1 mill. ac. for grain, 1·8 mill. ac. for fruit and vegetables, and 1·18 mill. for other products. That is to say, to the land already under cultivation might be added an area (5·5 mill. ac.) twice as large, making a grand total of 8·2 mill. ac. out of a total land area of 16·2 mill. ac. Pasture land, not included in 'cultivated area', comprises 680,000 ac.

Produce (av. 1907–11). Rice, 11 mill. bush. (1910–11, 11·6 mill. bush.); tea, 184 mill. lb. (1911, 186·6 mill. lb); rubber, 2·8 mill. lb. (1901, 7,392 lb., 1911, 6·8 mill); cocoa, 8·25 mill. lb. (1911, 6·88 mill. lb.).

Live stock.—Av. no. of black cattle (1906–11) 1,018,000; buffaloes, 533,000; sheep, 97,200; goats, 182,000; pigs, 95,600; and horses, 4,100.

Minerals.—Av. of five years, 1906–10:

	£1,000.	% of total.	H.Y.	£1,000.
Plumbago	604·4	74·66	1906	700·0
Salt	104·4	12·90	1910	159·0
Stone	58·0	7·16	1910	74·0
Precious stones and pearls	37·4	4·62	1906	148·0
Coral	5·2	0·66	1907	7·2
	809·4	100·0	1906	1,010·0

Ceylon Gov. Railways.—Mileage open at end of year 1911, 578; av. receipts (1907–11) £802,000 (1911, £905,000); av. working expenses (1907–11) £388,000 (1911, £422,500). Total cost of construction to June 1911, £6,377,000.

Canals.—Length open to traffic, 153·02 m., i.e. boat channel to Jaffna Lake, 40·75; Colombo—Bolgoda, 16; Toppu—Puttalam, 60; others, 36·27.

SHIPPING

Av. of years.	Total shipping. 1,000 tons.	H.Y.	1,000 tons.	British shipping. 1,000 tons.	% of total.
1897–1901	7,748	1901	9,028	5,868	75·75
1902–6	13,191	1906	13,300	8,047	60·94
1907–11	14,178	1911	14,927	9,490	66·94

Nationality of vessels.—Av. 1907–11, U. K., 9,267,000 tons (65·37 % of total); Colonial, 223,000 tons (1·57 %). Total Brit. Emp., 9,490,000 tons (66·94 %).

Foreign: German, 1,658,000 tons (11·69 %); French, 932,000 tons (6·57 %); Japanese, 798,500 tons (5·63 %); Austro-Hung., 367,000 tons (2·59 %); Dutch, 204,000 tons (1·44 %).

Principal ports.—Av. tonnage entered and cleared, 1907–11, at Colombo, 13,335,000 tons; Galle, 721,000.

Finance.—Av. Revenue (1907–11), £2,661,000; Av. Expenditure, £2,421,000. Public Debt, in 1901, was £3,606,000, and in 1911 £6,167,000.

Savings Banks.—Post Office:—The av. no. of depositors, deposit, withdrawal, and sum to the credit of the depositors for the five years, 1907–11, were respectively 80,100, £105,200, £89,500, and £169,200 (1911, 89,000, £130,775, £105,000, and £203,000). Government:—The av. no. of depositors, sum deposited, withdrawn, and credited during the five years, 1907–11, was as follows: 35,400, £125,000, £115,700, and £318,300 (1911, 37,099, £130,200, £110,500, and £343,500).

IMPORTS AND EXPORTS

General Progress

	Imports. £1,000.	From U. K. £1,000.	% of total.	Exports. £1,000.	To U. K. £1,000.	% of total.
1871	4,798·0	1,462·0	30·48	3,634	2,633	72·46
1881	4,417·5	1,199·5	27·78	3,393	2,019	59·51
1891	4,442·0	1,289·0	29·02	3,920	2,765	70·5
1901	7,508·0	2,058·0	27·4	5,993	3,344	55·8
1911	10,960·0	2,896·0	26·4	12,135	5,824	48·0

	Imports.			Exports.		
Av. of years.	£1,000.	H.Y.	£1,000.	£1,000.	H.Y.	£1,000.
1897–1901	7,153	1900	8,156	5,930	1899	6,722
1902–6	7,746	1906	8,233	7,032	1906	7,501
1907–11	9,617	1911	10,960	10,076	1911	12,135

Chief Articles Imported	Av. 1907–11 £1,000.	% of total.	H.Y. 1911. £1,000.	Chief Articles Exported	Av. 1907–11 £1,000.	% of total.	H.Y. 1911. £1,000.
Rice	2,856	29·0	3,027	Tea	5,244	52·4	5,660
Coal	818	8·5	788	Rubber	994	9·9	2,428
Cotton manu.	622	6·4	719	Coco-nut oil	899	9·0	876
Specie	613	6·3	493	Copra	660	6·6	878
Manures	319	3·0	446	Plumbago	553	5·5	444
Sugar	231	2·0	275	Coco-nut	417	4·1	546
Flour	223	2·0	263	Cacao	206	2·0	158
Cutlery	156	1·6	180	Cinnamon	177	1·7	139
Paddy	149	1·5	153	Coir and manu.	174	1·7	176
Tea chests	135	1·4	153	Areca nut	161	1·6	161
Machinery	126	1·3	183				
Fish	123	1·3	145				

TRADE WITH PRINCIPAL COUNTRIES.* AV. OF YEARS 1907–11

	IMPORTS £1,000.	% of total.	H.Y. 1911. £1,000.	EXPORTS £1,000.	% of total	H.Y. 1911. £1,000.
U. K.	2,475	25·7	2,896	4,892·0	48·8	5,824
India	4,790	49·8	5,442	Australasia 720·0	7·2	748
Straits Settlem.	606	6·3	602	India 466·6	4·6	523
Tot. Br. Emp.	8,474	88·0	9,575	Canada 222·0	2·2	258
				Tot. Br. E. 6,449·0	64·2	7,523
Foreign countries:				Foreign countries:		
Germany	241·0	2·5	325·0	U. States 1,208	11·9	1,752
Japan	120·0	1·25	145·0	Germany 775	7·7	1,075
U. States	92·6	0·96	146·0	Russia 733	7·3	820
Java	88·4	0·92	131·0	Belgium 290	2·8	427
Austria-Hung.	73·0	0·76	64·0	China 194	1·9	170
French poss.	72·6	0·75	55·6	Austria-Hun. 134	1·3	62
France	64·0	0·66	86·0	Total For. co. 3,627	25·8	4,612
Total For. co.	1,143·0	12·0	1,385·5			

* Imports are classified according to country of production, exports are credited to the countries to which they were exported.

CEYLON CENSUS, 1911

	*Total population.** *Persons.*	*Males.* 1,000.	*Females.* 1,000.	*Persons per sq. m.*	*% of inc.* 1901–11.
Ceylon	4,106,350	2,175·0	1,931·0	162	15·15
Western province	1,106,321	1,592·0	514·0	773	20·16
Central province	672,258	358·5	313·8	294	7·84
Northern province	369,651	184·2	185·4	110	8·42
Southern province	628,817	316·9	311·9	293	10·95
Eastern province	183,698	94·4	89·3	48	5·86
North-western province	434,116	240·4†	193·7†	144†	22·76†
North central province	86,276	47·6	38·6	21	8·95
Uva province	216,692	115·6	101·0	66	16·44
Sabaragamuwa	408,521	225·5	183·0	216	26·97

* Exclud. military population (persons 1,489, M. 1,359, F. 130), and shipping population (persons 2,528, M. 2,284, F. 244).

† Exclus. of pilgrims the figures would be 427,649 persons: 236,676 M., 190,973 F., 142 persons per sq. m., and % of incr. 20·93.

POPULATION (exclusive of Military and Shipping)

	Total.	*Increase %*	*Males.*	*Females.*
1881	2,759,738	—	1,469,553	1,290,185
1891	3,007,789	8·9	1,593,376	1,414,413
1901	3,565,954	18·6	1,896,212	1,669,742
1911	4,106,350	15·2	2,175,030	1,931,320

Urban and Rural population.—1901: Urban, 408,277 (11·4 %); Rural, 3,157,677 (88·6 %). 1911: Urban, 502,828 (13·9 %), % of increase 1901–11, 23·16; Rural, 3,603,522 (86·1 %), % of increase 1901–11, 14·12.

Population by race, 1911.—Low Country Sinhalese, 1,716,859 (41·8 % of total pop.); Kandyan Sinhalese, 998,561 (24·3 %); Ceylon Tamils, 528,024 (12·8 %); Indian Tamils, 530,983 (12·9 %); Ceylon Moormen, 233,901 (5·70 %); Indian Moormen, 32,724 (0·80 %); Burghers and Eurasians, 26,663 (0·65 %); Malays, 12,990 (0·31 %); Europeans,* 7,592 (0·18 %); Veddahs, 5,332 (0·13 %); others, 12,721 (0·31 %).

* Including English 5,060, Scotch 1,086, Irish 608, Welsh 47, French 297, German 177.

Population by religions.—Buddhists, 2,474,170 (60·25 % of pop.); Hindus, 938,260 (22·85 %); Christians, 409,168 (9·96 %); Muhammadans, 283,631 (6·91 %); others, 1,121 (0·03 %).

Christian pop.: Roman Cath., 339,299; Ch. of Eng., 41,095; Presbyterian, 3,546; Wesleyan Meth., 17,323; Baptist, 3,306; Congregationalist, 2,978; Salvationist, 1,042; other Christian Sects, 579.

Immigration and emigration.—Av. immigration of Indian coolies, 1902–6, 95,300; emigration, 58,500. Av. 1907–11, immigration, 87,600; emigration, 65,400. The greatest no. of immigrants in any one year (1902–11) was 160,000 in 1905, and of emigrants, 78,740 in 1908.

Vital statistics.—The birth-rate in 1910 was 39 per 1,000 persons living (19·9 for Europeans and 41·8 for Sinhalese). The av. birth-rate, 1898–1908, was 38 per 1,000. The marriage-rate in 1910 was 11·7 per 1,000 persons living, and the av., 1898–1908, 13·9. The death-rate in 1910 was 27·3 per 1,000 (13·7 for Europeans and 32·1 for Tamils). The av., 1898–1908, death-rate was 28·5.

STRAITS SETTLEMENTS

Area, 1,600 sq. m., i.e. 1·318 % of that of the U. K.

AREA OF LAND UNDER PRINCIPAL CROPS. Av. of Years 1908–11

	Paddy.	*Fruit.**	*Tapioca.*	*Spices.*†	*Sugar-cane.*	*Rubber.*	*Total area cult.*
	1,000 *ac.*	1,000 *ac.*	1,000 *ac.*	1,000 *ac.*	1,000 *ac.*	1,000 *ac.*	1,000 *ac.*
Singapore . .	—	24·7	0·06	5·45	—	17·1	47
Penang, Dindings & Prov. Wellesley .	53·5	94·8	13·4	9·54	5·53	18·4	735
Malacca . .	40·23	46·3	32·0	—‡	—	69·0	461

* Including coco-nut, pine-apple, and gardens.

† Including essence grasses, gambier, and pepper.

‡ The returns give the area in each year as 4,834 acres, 85,237 acres, 10,930 acres, and 12,000 acres. There appears to be some doubt as to the reliability of the statistics for 1909.

Av. quantity of rubber produced, 1907–11, 1,086,000 lb. Av. val., 1909–11, £485,000. In 1906 the output of rubber amounted to 25,560 lb.; in 1911 the output was 3,137,000, valued at £823,700; in 1912, 7·3 mill. lb., £1,535,000.

Fisheries.—The av. (1908–10) no. of fishing boats reg. at Singapore was 182, Penang 2,783, and Malacca 1,273.

Minerals.—The av. amount of coal mined, 1907–11, in Labuan was 44,000 tons, valued at £31,000.

Average Number of Factories, 1908–11

Singapore.—Copra factories, 14; dyehouses, 26; sago manufactories, 10; steam saw mills, 18; tallow-melting works, 38; tanneries, 16.

Penang.—Bread and biscuit factories, 50; dye-houses, 18; engineers, iron and brass founders' works, 14; fish curing factories, 61; oil manufactories, 25; quarries, granite, and red earth, 38; soap and candle works, 37; tanneries, 14; tapioca manufactories, 25.

Province Wellesley.—Brick and lime kilns, 20; indigo manufactories, 48; oil distilleries, 25; oil manufactories, 14; potteries, 14; quarries, 17; rice mills, 30; sago factories, 16; tapioca factories, 330.

Malacca.—Coco-nut oil works, 29; Gambier factories, 130; steam tapioca factories, 16.

Railways.—Length of line open, Singapore Gov. Railway, 21 m. Av. receipts, 1907–11, £29,310 (1911, £38,576); working expenditure, £20,150 (1911, £23,073). Working expenditure to receipts, 68·7 %. Cost of construction, £541,275; per m. £25,775. Labuan possesses 9 m. of private railway, the receipts from which appear to have been £54 in 1911 (the only statistics available) and working expenditure £200. The other railways in the Straits Settlements, Province Wellesley 23 m., Malacca 22 m., are included with those in operation in the Fed. Malay States.

Shipping.—For the purposes of comparison the statistics for Labuan, treated as a part of the colony of the Straits Settlements from 1908 inclusive, have been included throughout.

Av. of years.	*Straits Settlements and Labuan.* 1,000 *tons.*	*Labuan.* 1,000 *tons.*	*H.Y.*	1,000 *tons.*	*British vessels (av.).* 1,000 *tons.*	% *of total.*
1897–1901	12,996	360	1901	15,420	7,950	61·1
1902–6	17,283	313	1906	18,250	10,240	59·2
1907–11	20,370	—	1911	21,932	11,490	56·4

In the period 1908–10, when British tonnage comprised 59·37 % of the whole, German tonnage amounted to 3 mill. or 13·37 % of the whole. Dutch tonnage was 8·24 % of the whole, and Japanese 5·9 %.

Principal ports.—Singapore (av. 1907–11) 14,381,000 tons, Penang 6,983,000.

Ships built.—Av. no. of sailing vessels built (1907–11) 901, tonnage 10,478; steam vessels 11, tonnage 464; total 912, tonnage 10,942.

IMPORTS AND EXPORTS

IMPORTS (includes Labuan from 1908)

Av. of years.	*Straits Settlements.* £1,000.	*Labuan.* £1,000.	*Total.* £1,000.	*From the U.K.* £1,000.	% *of total imp. to Settlements.*
1897–1901	26,810	127·2	26,937·2	3,022	11·2
1902–6	34,310	178·4	34,488·4	3,396	9·9
1907–11	—	—	40,698·0	4,674	11·48
		Highest Year. Imports			
1900	31,409	175	31,584	3,289	10·4
1906	39,586	220	39,806	4,108	10·3
1911	—	—	46,437	4,759	10·2
		EXPORTS (includes Labuan from 1908)			
1897–1901	22,824	84	22,908	4,214	18·4
1902–6	29,610	148	29,758	6,266	21·0
1907–11	—	—	35,644	8,822	24·7
		Highest Year. Exports			
1900	26,262	103	26,365	6,040	23
1906	36,284	181	36,465	9,127	25·1
1911	—	—	39,887	10,023	25·3

The av. imp. (1908–11) into Christmas Island, included in the return of the Straits Settlements, were £9,600 (H. Y. 1910, £15,600). The exp. from the island av. £330,000 (H. Y. 1910, £413,000).

CHIEF ARTICLES IMPORTED AND EXPORTED. Av. 1907–11

IMPORTS	£1,000.	% *of total imp.*	*H.Y.* 1911. £1,000.	EXPORTS	£1,000.	% *of total imp.*	*H.Y.* 1911. £1,000.
Tin ore	6,403·8	15·7	7,522	Tin	9,161	25·7	10,738
Rice	4,456·0	10·9	5,472	Rice	4,218	11·8	4,458
Cotton goods, &c.	2,516·6	6·1	2,828	Copra	1,486	4·1	1,984
Tin	2,117·0	5·2	2,259	Rubber (Para)	1,448	4·0	2,927
Opium	1,442·0	3·5	1,735	Cotton goods	1,345	3·7	1,262
Copra	1,364·4	3·3	1,731	Specie, silver	1,271	3·5	679
Rubber	1,354·8	3·3	2,306	Opium	1,199	3·3	1,615
Fish	1,033·6	2·5	1,169	Fish	971	2·7	1,062
				Pepper	913	2·5	863

TRADE WITH PRINCIPAL COUNTRIES, 1907–11*

	Imports			Exports		
From:	£1,000.	% of total.	H. Y. 1911. £1,000.	To: £1,000.	% of total.	H. Y. 1911. £1,000.
U. K. . .	4,674	11·74	4,759	8,822	24·78	10,023
Fed. Malay St.	8,610	21·17	10,075	5,053	14·2	5,743
India . .	5,176	12·73	6,414	2,011	5·65	2,197
Hong Kong .	3,640	8·95	4,389	1,296	3·64	1,433
Johor . .	1,008	2·48	1,030	566	1·58	650
Tot. Brit. Emp.	25,038	61·81	29,562	19,370	54·42	21,898
Foreign countries:						
Dutch poss. .	5,902	14·52	6,590	5,145	14·45	5,651
Siam . .	3,983	9·79	4,216	1,767	4·96	1,400
French poss. .	1,105	2·71	1,069	266	0·7	235
Japan . .	885	2·19	1,054	393	1·1	484
China . .	864	2·12	1,014	470	1·3	560
Germany .	638	1·57	719	1,120	3·14	1,518
Holland. .	247	0·60	227	250	0·7	324
France . .	202	0·49	223	1,100	3·14	1,163
U. States .	418	1·02	405	3,431	9·63	4,268
Total For. co.	15,627	38·19	16,875	16,239	45·58	17,989
Grand Total .	40,665	100	46,437	35,609	100	39,887

* Imports are credited to countries from which they were received directly, exports to the countries to which they were exported.

POPULATION

Settlement.	1891.	1901.	1911.
Singapore	184,554	228,555	309,185
Christmas Is.	9	704	1,369
Cocos-Keeling Is. . . .	554	645	749
Penang, Wellesley, and Dindings . . .	235,618	248,207	279,274
Malacca	92,170	95,487	124,952
Total Straits Settlements . .	512,905	573,598	715,529
Labuan	5,853	8,411	6,546

The total population of 1911 comprised 474,874 males, and 247,201 females. That is to say, to every 1,000 females there are 1,921 males.

Population and occupations (1911):

	Area. sq. m.	*White pop.* 1,000.	*Coloured pop.* 1,000.	*Pop.* per sq.m.	*Persons employed in* Agricul-ture. 1,000.	Manu-facture. 1,000.	Com-merce. 1,000.
Singapore . .	217	6·3	302·88	1,425·0	11·99	8·74	40·86
Labuan . .	28	0·04	6·5	233·8	1·10	0·15	0·77
Christmas Is. .	62	0·02	1·35	22·0	—	—	—
Cocos-Keeling Is.	2	0·04	0·71	374·5	—	—	—
Penang . .	108	1·23	141·65	1,318·0	9·29	3·04	16·41
Prov. Wellesley .	280	0·24	128·74	460·6	35·56	2·06	9·31
Dindings . .	183	0·01	7·88	43·0	1·56	0·1	0·86
Malacca . .	720	0·34	124·6	173·5	15·15	3·26	11·06
	1,600	8·22	713·85	451·3	74·65	17·35	79·27

Increase % on intercensal period, 24·3.

Immigration.—Chinese and Indians only: 1901, 255,000; 1911, 460,374; average, 1907–11, 335,701.

Emigration.—Indian Coolies only: 1901, 16,204; 1911, 48,103; average 1907–11, 36,000.

Religions.—No. in thousands: Non-Christian and non-Muhammadan Chinese, 362·8 (50·3 %); Muhammadans, 266·3 (36·7 %); Hindus, 52·64 (7·2 %); Christians, 27·7 (3·8 %); Buddhists (non-Chinese), 2·8 (0·4 %); Jews, 0·77 (0·1 %).

REVENUE

Average of years.	Straits Settlements. £1,000.	Labuan. £1,000.	Total. £1,000.	H.Y.	£1,000.	Customs (including licences). Straits. £1,000.	Labuan. £1,000.	% of total.
1897–1901	525	5·13	530·13	1901	679	315	2·56	59·9
1902–6	930·6	5·23	935·83	1905	1,170	577	2·74	61·9
1907–11	1,132		1,132	1911	1,331	688		60·7

EXPENDITURE

1897–1901	534	6·12	540·12	1901	707
1902–6	900	6·17	906·17	1905	1,104
1907–11	1,038			1908	1,148

Public debt, 1901, nil; 1911, £7,943,452 (av. 1907–11, 6·2 mill.).

Savings Bank (Post Office).—The no. of depositors, amount deposited, withdrawn, and standing to the credit of depositors at the close of the year 1901 were respectively, 2,745, £36,200, £32,200, and £48,700; in 1911, 4,812, £62,600, £55,470, and £88,300; while the av., 1907–11, was 4,221, £55,500, £53,600, and £78,000.

FEDERATED MALAY STATES

Area.—Perak 7,800 sq. m., Selangor 3,156 sq. m., Negri Sembilan 2,550 sq. m., Pahang 14,000 sq. m. Total, 27,506 sq. m.

MINERALS

TIN PRODUCTION (av. of 5 years, 1906–10)

	1,000 tons.	Value. £1,000.	H. Y.	£1,000.
Perak	26·4	3,993	1906	4,557
Selangor	15·8	2,403	1906	2,808
Negri Sembilan	3·57	551	1906	813
Pahang	2·27	341	1910	367
Total	48·04	7,288	1906	8,538

GOLD PRODUCTION (av. of 5 years, 1906–10)

	oz.			
Perak	1,100	4·4	1909	5·1
Negri Sembilan	109	0·4	1906	1·7
Pahang	13,757	55·0	1910	63·5
	14,966	59·8	1910	67·0

Wolfram to the value of £5,000 per annum is also produced in Perak and Selangor.

In 1911 the gold products amounted to £35,760 (Pahang £29,750); tin, £8,125,300 (Perak £4,791,000); total mineral prod. £8,170,922.

Railways.—The Fed. Malay States Govt. Railways possess 559 m. of line open to traffic in Malacca, Province Wellesley (Straits Settlements), Fed. Malay States, and Johor; the av. receipts (1907–11) amounted to £698,000, and the working expenses to £425,000, i.e. 62·4 % of the total rev. The cost of construction averaged £11,100 per m.

SHIPPING (total net tonnage of vessels entered and cleared)

Av. of years.	*Perak.* 1,000 *tons.*	*Selangor.* 1,000 *tons.*	*Negri Sembilan.* 1,000 *tons.*	*Pahang.* 1,000 *tons.*
1897–1901	274	369	187	not available.
1902–6	356	859	517·7	
1907–11	374	2,039	469	143

IMPORTS AND EXPORTS

Av. of years.	*Perak.* £1,000.	*Selangor.* £1,000.	*Negri Sembilan.* £1,000.	*Pahang (Approx.)* £1,000.	*Total.* £1,000.	*H. Y.*	£1,000.
			Imports.				
1897–1901	1,243	1,425	279	114	3,061	1901	3,673
1902–6	1,962	2,113	481	114	4,070	1906	5,941
1907–11	2,756	2,880	528	233	6,397	1911	7,762
			Exports.				
1897–1901	2,286	1,865	537	209	4,897	1901	6,312
1902–6	3,731	2,614	817	341	7,503	1906	9,426
1907–11	4,913	4,109	880	459	10,361	1911	13,557

PRINCIPAL ARTICLES IMPORTED AND EXPORTED. Av. of five years, 1907–11

Imports.	£1,000.	% *of total.*	*H. Y.* 1911. £1,000.	*Exports.*	£1,000.	% *of total.*	*H. Y.* 1911. £1,000.
				Perak.			
Rice	660	23·97	713	Tin ore	3,096	63·1	3,727·0
Opium	260	9·43	595	Tin	922	18·8	1,072·0
Tobacco	136	4·95	166	Rubber	520	10·6	1,283·0
Cutlery	120	4·35	137	Sugar	75	1·5	27·4
Cotton goods	108	3·92	115	Copra	66	1·3	113·6
Machinery	89	3·25	104	Paddy	64	1·3	54·1
				Selangor.			
Rice	610·6	21·2	706	Tin ore	1,856	45·2	1,942·0
Specie	282·5	9·8	218	Rubber	1,530	37·3	2,781·0
Cutlery	237·0	8·2	353	Tin	505	12·3	595·0
Opium	142·0	4·9	173	Coffee	36	0·9	35·3
Cotton goods	112·7	3·9	138	Copra	28	0·6	34·4
Tobacco	98·5	3·4	138				
Machinery	83·2	2·8	110				
				Negri Sembilan.			
Rice	138·7	26·2	155·0	Tin ore	335·5	38·1	319·9
Opium (1907–10)	42·2	8·0	—	Rubber	310·8	35·3	588·0
Cutlery	27·6	5·2	31·7	Tin	116·6	13·2	1·0
Tobacco	24·9	4·7	28·0	Tapioca	59·4	6·7	31·9
Cotton goods	17·7	3·3	24·1	Gambier	24·4	2·7	19·6

Pahang.

Imports.	£1,000.	% *of total.*	*H. Y.* 1911. £1,000.	*Exports.*	£1,000.	% *of total.*	*H. Y.* 1911. £1,000.
Rice . .	44·2	19·4	56·0	Tin ore .	243·9	53·0	314·3
Opium .	25·3	10·8	33·3	Tin. .	121·5	26·4	167·5
Specie .	21·0	9·0	8·8	Bull., gold	51·9	11·2	30·6
Cutlery .	17·96	7·7	26·3				

TRADE WITH PRINCIPAL COUNTRIES. Av. 1907–11

	Imports			Exports		
	£1,000.	% *of total.*	*H. Y.* 1911. £1,000.	£1,000.	% *of total.*	*H. Y.* 1911. £1,000.
U. K. . .	529·5	8·27	736·0	1,332·75	12·86	2,871·0
Singapore . .	3,262·0	50·99	3,526·0	4,241·41	40·94	4,545·0
Penang . .	2,197·5	34·34	2,963·0	4,332·06	41·81	5,500·8
Malacca . .	124·5	1·95	73·3	79·12	·76	55·5
Total Brit. Emp.	6,233·5	97·43	7,462·6	10,149·47	97·96	13,254·8
Foreign countries	163·5	2·57	299·4	211·98	2·04	311·3
Total imports	6,397·0	100·0	7,762·0	10,361·45	100·0	13,566·1

POPULATION

	Perak.	*Selangor.*	*Negri Sembilan.*	*Pahang.*	*Total.*
1891	214,254	81,592	65,219	57,462	418,527
1901	329,665	168,789	96,028	84,113	678,595
1911 : Males .	344,238	220,939	87,651	72,234	725,062
„ Females .	149,819	73,096	42,548	46,474	311,937
Total . .	494,057	294,035	130,199	118,708	1,036,999
Incr. % 1901–11	49·9	74·7	35·3	41·1	52·8
Pop. per sq. m. .	63·34	93·16	51·05	8·47	37·1
Urban pop. (1,000) . .	115·8 (23·4% of total pop.)	82·1 (27·9%)	17·7 (13·5%)	7·3 (6·2%)	222·9 (21·5%)
*Males per 1,000 females . .	2,294	3,026	2,060	1,558	2,324

* The preponderance of male over female is due to the large number of Chinese immigrants.

Immigration and emigration.—During the period 1906–10 the East Indian indentured immigrants averaged 2,972 per ann., and total immigrants 408,070 per ann., while the emigrants averaged 329,727. In 1901 the immigrants numbered 234,000, ten years later their total was 399,900; the emigration returns of 1901 show that 176,600 emigrated as compared with 269,400 in 1911.

Races (1911).—Europeans, 3,290 (0·32% of total pop.); incr. %, 1901–11, 125. Eurasians, 2,650 (0·25%); incr. %, 1901–11, 73·6. Malays, 420,840 (40·5%); incr. %, 1901–11, 34·3. Chinese, 433,200 (41·78%); incr. %, 1901–11, 43·7. Indian, 172,400 (16·62%); incr. %, 1901–11, 195·4.

Religions.—Confucian, 415,000; Muhammadan, 406,800; Hindu, 140,000; Christian, 22,900; Sikh, 7,400.

REVENUE AND EXPENDITURE

(I) Federated Malay States

	Revenue.			Expenditure.		
Av. of years.	£1,000.	*H. Y.*	£1,000.	£1,000.	*H. Y.*	£1,000.
1897–1901	1,320·0	1901	1,710·0	1,194·0	1901	1,720
1902–6	2,365·0	1906	3,185·7	1,695·5	1906	2,205
1907–11	3,271·86	1911	4,089·7	2,767·68	1908	3,018

(II) Single States (av. 1907–11)

Perak.

Revenue. *From customs.*						Expenditure.	
Imp. duty. £1,000.	*Exp. duty.* £1,000.	*Other* £1,000.	*Total.* £1,000.	*Total revenue.* £1,000.	*H. Y.* 1911. £1,000.	£1,000.	*H. Y.* 1911. £1,000.
151·34	541·75	1·67	694·76	1,768·7	2,226	1,387·0	1,525

Selangor.

							H. Y. '08
102·45	346·25	0·91	449·61	1,155·3	1,438·5	956·0	1,076

Negri Sembilan.

							H. Y. '08
29·98	72·76	—	102·74	244·0	293·0	240·28	278·7

Pahang.

							H. Y '10
—	34·37	—	37·32	103·86	132·2	184·4	204·7

Public debt outstanding in 1901, £407,050; 1911, £1,073,300. Av. 1907–11, £914,000.

Government Savings Bank (av., 1907–11).—No. of depositors, 4,621 (1911, 6,200); amount deposited, £60,060 (1911, £69,330); amount withdrawn, £43,630 (1911, £58,780); standing to credit of depositors at close of year, £58,650 (1911, £80,400).

PROTECTED MALAY STATES

Area (est.).—Kedah, 3,800 sq. m.; Perlis, 300 sq. m.; Kelantan, 5,500 sq. m.; Tringganu, 6,000 sq. m. Total, 15,600.

Minerals.—Exports of gold and tin ore (av. of three years, 1909–12). *Tin ore*: Kedah, 735 tons, val. £104,000; Perlis, 127 tons, val. £17,600; Kelantan, 55 tons, val. £2,500; Tringganu, 382 tons, val. £40,500. *Gold*: Kelantan, 5,200 oz., val. £20,900.

Imports and exports of Kelantan and Tringganu.—Kelantan (av. 1909–12): imp. £220,829, exp. £177,450; 1912, imp. £318,500, exp. £178,500. Tringganu (av. 1910–12): imp. £94,850, exp. £196,560; 1912, imp. £123,000, exp. £202,000.

Similar particulars for Kedah and Perlis not available.

Population (*census of* 1911).—Kedah, 245,986 (pop. per sq. m. 64·7); Perlis, 32,746 (pop. per sq. m. 109·1); Kelantan, 286,751 (pop. per sq. m. 52·1); Tringganu, 154,073 (pop. per sq. m. 25·6). Total, 719,556 (pop. per sq. m. 46·1).

Revenue and expenditure (av. of three years, 1909–1911).—*Revenue*: Kedah, £176,000; Perlis, £13,560; Kelantan, £49,700; Tringganu, not available. *Expenditure*: Kedah, £155,000; Perlis, £11,440; Kelantan, £52,700; Tringganu, not available.

JOHOR

Area, 9,000 sq. m., i.e. that of Lancs., Yorks., Cumberland, and Westmorland.

Agriculture (vide *Exports*).—Rubber estates (1911), 281,900 acres; under rubber, 75,200 acres; total cultivated area, 78,600 acres.

Railways (State).—Cost per m. £11,270; length, 120 m.; av. receipts (1909–11), £25,900 (1911, £38,400); av. working expenditure, £27,120 (1911, £45,280). Muar Light Railway.—Length 11m.; av. receipts (1909–11), £4,840 (1911, £5,440); av. expenses, £3,600 (1911, £3,790).

Exports (approx.).—Gambier, 12,800 tons (approx. value £206,000); pepper, 3,500 tons (approx. value, £100,000); rubber, 929,000 lb. (1911, 1,244,500 lb.); areca nut, 21,000 tons (approx. value, £140,000); coco-nuts, 6,700 tons (approx. value, £110,000); tapioca and sago, 7,000 tons (approx. value, £63,000); tin (smelted), 300 tons.

Population (1911).—Males, 122,129; females, 58,283; total, 180,412. Europeans, 205 (British, 161); males per 1,000 females, 2,095; density of population, 23 persons per sq. m.

Religions.—Muhammadans, 110,939 (61·36 % of total); non-Christians and non-Muhammadans, 63,005 (35·04 %); Hindus, 4,455 (2·48 %); Christians, 843 (0·47 %); Pagans, 847 (0·47 %); others, 323 (0·18 %).

Finance.—Revenue, £420,000 (1911, £461,000); expenditure, £360,000 (1911, £408,000); public debt (state railway), £1,303,900.

BRITISH NORTH BORNEO

Area, 31,106 sq. m., i.e. about 25 % of U. K.

Minerals.—Coal (Silimpopon) averages 30,000 tons per an., valued at £19,000 (1911, 33,500 tons, value £17,000).

Railways.—Brit. N. Borneo Co. Length 130 m.; av. receipts, 1907–11, £11,557 (1911, £16,935); working exp. £16,541 (1911, £19,775).

Shipping.—Entered and cleared at the port of Sandakan, including war vessels. Av., 1897–1901, 199,600 tons; av., 1904–6, 251,900 tons; av., 1907–11, 294,700 tons.

The av. tonnage of vessels entered and cleared at all ports, 1908–9–10, was (1) merchant vessels, 257,600 tons; (2) other vessels, 72,400; total, 330,000. Of the merchant vessels 61 % are of German nationality and 31 % British.

IMPORTS AND EXPORTS

	Imports (incl. treasure)				Exports (incl. treasure)			
Av. of years.	£1,000.	*H. Y.*	£1,000.	*Treasure.* £1,000.	£1,000.	*H. Y.*	£1,000.	*Treasure.* £1,000
1897–1901	263·0	1901	326·3	28·4	319·0	1899	344·0	12·8
1902–6	301·4	1902	370·2	39·8	399·6	1906	567·0	13·2
1907–11	396·7	1911	537·0	35·7	535·5	1911	564·3	10·9

Principal imports and exports (av., 1907–11, £1,000).—*Imports*: grain, 92·75 (23·2 % of total), 1911, 129·6; cloth, 46·36 (11·6 %), 1911, 63·86; treasure, 35·72 (8·9 %), 1911, 48·23; provisions, 31·85 (7·9 %), 1911, 46·39. *Exports*: tobacco, 287·5 (53·6 %), 1911, 250·4; timber, 68·0 (12·7 %), 1911, 79·3; cutch, 25·0 (4·6 %), 1911, 25·9; rubber, 23·6 (4·4 %), 1911, 50·84.

Population.—1891 (estimated), 114,000; 1901 (census), 104,527; 1911, 208,183. Population per sq. m. 6·7.

	Revenue *			Expenditure †		
Av. of years.	£1,000.	*H. Y.*	£1,000.	£1,000.	*H. Y.*	£1,000.
1897–1901	51·1	1901	65·9	52·2	1897	57·6
1902–6	96·3	1906	116	56·2	1903	59·4
1907–11	178·9	1909	236·3	89·4	1911	96·7

* Inclusive of land sales.

† Inclusive of sums spent on railway construction and other pub. works in 1897–8–9, and exclusive of the same from the last-mentioned date onwards.

BRUNI

Area.—4,000 sq. m. Approx. that of Devon and Cornwall.

Minerals.—Total av. produc. of coal (1906–10) 20,000 tons (1911, 25,600 tons, value £19,200).

Imports and exports (av. 1908–10).—*Principal articles imported*: Piece goods, £4,000; tobacco, £1,900; sugar, £1,100; other imports, £2,000 total, £9,000. *Exports*: cutch, £20,600; other exports, £1,200; total, £21,800.

Population (1911).—Males, 10,539; females, 11,179; total, 21,718. No. of Europeans, 20. Males per 1,000 females, 987.

Revenue and expenditure (av. 1907–11).—*Revenue*: £7,850 (1911, £12,760); customs, £2,900 (1911, £5,240). *Expenditure*: £9,270 (1907, £10,865).

TERRITORY OF SARAWAK

Area (est.).—42,000 sq. m., i.e. 34·6 % of that of U. K.

Minerals.—The av. amount of coal annually mined at Brooketon (Bruni), 1907–11, was 15,000 tons (av. value £14,500) (1911, 19,000 tons), and at Sadong (Sarawak) 20,200 tons (av. value £16,800) (1911, 25,000 tons).

The av. exports of gold at various periods were as follows: 1898–1901, £77,400; 1902–6, £191,990; and 1907–11, £166,670. During the period 1906–10 the annual production was 34,000 oz. (1911, 28,272 oz.).

PRINCIPAL IMPORTS AND EXPORTS. Av. 1907–11

	Imports				Exports			
	£1,000.	% *of total.*	*H. Y.* 1910. £1,000.		£1,000.	% *of total.*	*H. Y.* 1910. £1,000.
Rice	83·18	13·0	97·0	Pepper	178·0	22·4	179·3
Cloth, cotton	69·95	10·9	89·5	Gold	166·67	21·0	110·9
Treasure	67·55	10·5	100·3	Sago	129·3	16·3	134·0
Tobacco	49·72	7·7	57·7	Gutta, mfrd.	82·78	10·4	216·5
Oils	28·39	4·4	35·0	Gutta, Jelutong	75·67	9·4	127·0
Machinery	20·6	3·2	25·7	Indiarubber	39·87	5·0	39·66
Opium	20·11	3·1	34·3	Treasure	25·48	3·2	16·51
Wine, beer, spirits	18·5	2·8	20·6	Gutta-percha	14·3	1·8	21·78
Sugar	14·88	2·3	18·8	Gambier	13·9	1·7	15·65

	Imports (including treasure)				Exports (including treasure)			
Av. of years.	£1,000.	*H. Y.*	£1,000.	*Treasure (av.)* £1,000.	£1,000.	*H. Y.*	£1,000.	*Treasure (av.)* £1,000.
1897–1901	338·6	1901	440·4	39·78	433·7	1901	590	69·7
1902–6	546·2	1906	603·6	69·3	726·0	1906	803	190·3
1907–11	638·9	1910	787·8	71·8	791·9	1910	951	159·1

Of the total imports 96·3 % are, on an average, from British poss. and 3·7 from foreign countries. Of the exports 96·1 go to British poss. and 3·9 % to foreign countries.

TRADE WITH PRINCIPAL COUNTRIES. Av. of five years 1907–11

Imports from:	£1,000.	% *of total.*	*H. Y.* 1910. £1,000.	Exports:	£1,000.	% *of total.*	*H. Y.* 1910. £1,000.
Singapore .	602·11	94·2	740·1		742·11	93·69	892·4
Labuan .	13·76	2·1	20·9		15·24	1·92	22·6
Total Brit. Emp.	618·10	96·7	761·35		763·46	96·38	921·1
Total For. co.	20·80	3·3	26·45		28·44	3·62	30·0
Grand total .	638·9	100·0	787·8		791·9	100·0	951·1

SHIPPING. Foreign trade. Total tonnage entered and cleared

Av. of years.	1,000 *tons.*	*H. Y.*	1,000 *tons.*
1897–1901	50·59	1901	75·5
1902–6	106·03	1906	115·8
1907–11	113·50	1910	121·5

Population (est.), 500,000, or approx. 12 persons per sq. m.

	Revenue			Expenditure		
Av. of years.	£1,000.	*H. Y.*	£1,000.	£1,000.	*H. Y.*	£1,000.
1897–1901	80·7	1901	106	74·9	1901	95·3
1902–6	131·7	1906	155	122·9	1906	147·2
1907–11	160·4	1907	168	148·4	1907	158·6

HONG KONG

Area (includ. the New Territories on the Kowloon Peninsula), 405 sq. m.
Live stock.—Av. no. of horses, 1907–11, 191 ; horned cattle, 1,461.
Railways.—Brit. section of Kowloon-Canton Railway, opened Oct. 1, 1910. Length, 30 m. Receipts for year 1912, £24,000. Expenditure, £20,600.

SHIPPING (exclus. of coasting trade and of Chinese junks)

Total net tonnage entered and cleared.

Av. of years.	100,000 *tons.*	*H. Y.*	100,000 *tons.*	*Brit. vessels (av.).* 100,000 *tons.*	% *of total.*
1897–1901	135	1901	147·0	88·0	65·25
1902–6	189	1906	198·0	118·97	62·87
1907–11	204	1910	209·6	117·8	57·71

During the period 1908–10, when the average British tonnage was 51·88 % of the total, Japanese tonnage averaged 10·84 %, and German tonnage 10·23 %.

Av. no. of vessels built, 1907–11, 68 of 6,281 net tonnage (1911, 75 vessels, 4,183 net tonnage).

Imports and exports.—No complete returns of trade. The coal imported during the period 1906–10 averaged 1,047,400 tons per annum, while the bunker-coal exported averaged 671,000 tons.

The opium imports during the period 1906–10 averaged 39,541 chests (1906, 47,567), and exports, 38,894 (1906, 47,576).

POPULATION

	Males. 1,000.	*Females.* 1,000.	*Total.*
1891	154·0	63·85	217,936
1901	263·5	122·65	386,159 *
1911	296·15	160·59	456,739 *

* Inclus. of pop. of new territories (includ. New Kowloon), viz. 102,254 in 1901, and 104,287 in 1911. In 1911 the pop. of New Kowloon was 13,693 persons.

Increase % in intercensal period, 18·2. Population per sq. mile, 1,127. *Sexes*: males per 1,000 females, 1,844.

Population by races.—Europeans and Americans other than Portuguese, 5,185 †; Portuguese, 2,558; Indians, 2,012; other non-Chinese, 1,470; total non-Chinese, 11,225; Chinese, 438,873. Total, 450,098. Mercantile marine, 6,641. Grand total, 456,739.

† English, 1,357; Scotch, 436; Irish, 140; Welsh, 38; America, U.S.A., 295.

Immigration and emigration (av., 1907–11).—Immigrants, 149,582 (1911, 149,894); emigrants, 100,220 (1911, 135,565). These statistics relate to the movements of Chinese from and to ports elsewhere than in China (principally in the Straits Settlements).

	REVENUE			EXPENDITURE		
Av. of years.	£1,000.	*H. Y.*	£1,000.	£1,000.	*H. Y.*	£1,000.
1897–1901	343·6	1900	420	319	1901	394
1902–6	595·0	1906	769	603	1906	747
1907–11	614·2	1907	708	615	1908	685

Note.—Since instituted in September 1909, the liquor duties (customs) have averaged £42,000 per annum (1911, £54,000). The average receipts from the opium monopoly licences, 1908–11, was £116,260 per annum, while assessed taxes (police, lighting, &c., rates) averaged £122,000 during the same period.

The public debt, including loan of £1,143,933 raised for advances to Viceroy of Wuchang, the repayments of which are expended on railway construction, £1,485,733.

WEI-HAI-WEI

Area, 285 sq. m.

Shipping.—Average (1908–11) total net tonnage, 485,000 (1911, 519,400).

Exports.—Ground nuts, av., 1907–11, 1,000 tons (1909, 2,357). Ground nut seed, av., 1907–11, 5,607 tons (1911, 8,460).

Population, 1901, 130,792; 1911, males, 77,860; females, 69,273; total, 147,133. Incr. % 1901–11, 12·5. Population per sq. m. 516·3. Males per 1,000 females, 1,124. Nationality, Chinese, 146,840; other nations, 293.

Revenue and expenditure.—Av. 1907–8—1911–12: revenue, £6,940 licences, £4,200); expenditure, £13,750.

APPENDIX

India: Normal Monthly and Annual Rainfall in inches

Province & District.	*Station.*	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Annual.*
Burma														
Mergui	Mergui	1·02	2·12	3·05	5·72	18·20	29·29	30·99	29·43	27·22	12·35	3·46	0·37	163·22
Rangoon	Rangoon	0·09	0·28	0·37	1·58	12·23	17·57	20·93	19·67	15·63	6·75	2·38	0·15	97·63
Toungoo	Thandaung	0·33	0·46	1·55	1·18	18·76	41·64	57·49	51·99	36·45	16·15	5·07	0·09	231·16
Thayetmyo	Thayetmyo	0·03	0·12	0·18	0·84	4·53	6·55	6·77	6·25	6·19	4·01	1·67	0·20	37·34
Myingyan	Sale	0·0	0·19	0·15	0·61	2·47	3·0	1·69	2·08	4·46	2·83	1·11	0·13	18·72
Mandalay	Mandalay	0·04	0·07	0·20	1·13	5·65	5·38	3·26	4·11	6·08	5·0	1·72	0·33	32·97
Mandalay	Maymyo	0·07	0·16	0·49	1·88	9·31	9·02	5·56	8·29	11·14	7·15	3·04	0·46	56·57
Bhamo	Bhamo	0·61	0·46	0·67	1·71	5·80	14·41	17·28	15·44	9·17	3·94	1·64	0·56	71·69
Akyab	Akyab	0·07	0·12	0·58	1·70	11·62	45·06	52·77	43·21	21·71	9·89	3·98	0·73	191·44
Northern Shan States	Lashio	0·24	0·28	0·62	2·05	6·05	10·87	12·48	13·47	7·58	5·43	2·42	0·76	62·25
Chin Hills	Fort White	0·32	0·94	1·44	3·61	6·78	21·61	29·12	27·10	24·19	10·67	3·06	0·85	129·69
Assam														
Cachar	Silchar	0·83	2·04	7·84	14·62	15·22	22·27	19·12	20·37	13·93	6·49	1·40	0·43	124·56
Sylhet	Sylhet	0·47	1·17	6·43	13·91	20·15	32·34	26·07	25·87	21·94	8·67	1·11	0·36	158·43
Manipur	Manipur	0·61	1·78	3·90	5·32	5·64	10·44	11·12	10·27	5·81	4·85	1·47	0·61	61·82
Lakhimpur	Dibrugarh	1·76	1·94	4·33	11·83	9·22	18·97	20·23	19·65	12·64	4·26	1·31	0·36	106·50
Darrang	Bishnath	1·11	0·99	2·61	6·73	8·15	14·36	17·27	19·65	11·65	5·29	0·52	0·25	88·58
Nowgong	Lunka	0·30	0·64	2·25	3·55	4·03	6·92	7·04	8·35	7·34	4·09	0·54	0·15	45·20
Kamrup	Gauhati	0·38	0·92	2·38	6·43	9·45	14·73	10·13	9·45	6·15	2·46	0·31	0·09	62·88
Goalpara	Dhubri	0·36	0·67	1·99	4·75	14·94	24·20	16·49	13·07	14·25	3·59	0·26	0·05	94·62
Goalpara	Bijni	1·36	0·75	2·77	10·40	17·41	25·42	26·67	19·90	19·84	5·69	0·37	0·14	130·72
Khasi and Jaintia Hills	Shillong	0·26	1·35	2·13	4·21	9·17	17·18	15·29	16·35	10·99	6·07	1·46	0·19	84·65
	Cherrapunji	0·38	2·69	8·60	33·18	32·16	90·95	104·70	84·81	35·06	14·52	2·61	0·24	409·90
Lushai Hills	Demagiri	0·41	1·23	3·49	5·40	11·39	19·76	17·87	18·63	16·78	7·17	1·70	0·69	104·52
Bengal														
Chittagong	Chittagong	0·34	0·98	2·68	4·76	9·31	20·39	21·34	17·97	11·63	6·22	1·82	0·79	98·23
Bakarganj	Barisal	0·55	1·02	2·08	4·01	8·89	15·38	15·23	13·55	11·31	5·93	1·30	0·47	79·72
Dacca	Narayanganj	0·34	1·32	2·57	4·95	8·94	12·62	12·46	12·17	9·37	4·58	0·96	0·17	70·45

Province & District.	Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
Bengal (*continued*)														
Mymensingh	Mymensingh	0·42	1·0	2·28	5·57	13·03	18·74	16·68	15·24	14·08	5·20	0·73	0·07	93·04
Bogra	Bogra	0·47	0·88	1·34	1·92	8·34	13·23	12·83	12·26	11·73	4·22	0·65	0·03	67·90
Malda	Malda	0·70	0·95	0·75	1·03	4·48	9·32	10·50	10·74	10·24	3·85	0·24	0·02	52·82
Cooch Behar	Cooch Behar	0·16	0·64	1·99	4·99	16·44	33·45	29·53	25·73	26·59	6·03	0·08	0·07	145·70
Jalpaiguri	Jalpaiguri	0·34	0·61	1·25	3·48	11·39	23·68	31·59	25·74	19·75	4·41	0·10	0·08	122·42
24 Parganas	Calcutta	0·41	1·15	1·25	1·75	5·74	11·43	12·89	12·16	10·35	3·91	0·56	0·21	61·81
Murshidabad	Berhampore	0·42	0·94	1·06	1·48	5·24	9·33	10·80	11·74	10·08	3·55	0·52	0·11	55·27
Burdwan	Burdwan	0·41	1·14	1·45	2·18	6·36	9·59	12·91	11·53	8·70	2·91	0·66	0·16	58·0
Midnapore	Midnapore	0·57	1·13	1·33	1·97	5·05	9·74	12·78	12·56	8·76	3·29	0·69	0·25	58·12
Darjiling	Darjiling	0·64	0·99	1·77	3·66	8·74	22·77	32·37	26·60	18·46	4·49	0·29	0·22	121·0
Bihar and Orissa														
Purnea	Purnea	0·45	0·60	0·54	1·15	4·45	11·07	14·16	13·60	12·72	2·92	0·10	0·10	61·86
Darbhanga	Darbhanga	0·55	0·49	0·48	0·70	2·86	8·29	11·79	13·38	8·93	2·74	0·10	0·06	50·37
Champaran	Motihari	0·57	0·47	0·45	0·85	2·81	9·47	15·40	13·63	9·49	2·67	0·20	0·16	56·17
Patna	Patna	0·61	0·71	0·46	0·32	1·66	7·87	12·21	12·88	7·29	2·76	0·17	0·09	47·03
Shahabad	Buxar	0·72	0·72	0·33	0·19	0·67	5·32	11·17	11·90	6·88	2·70	0·41	0·21	41·22
Santal Parganas	Naya Dumka	0·58	0·75	0·98	1·0	3·27	9·45	13·65	12·95	9·49	3·21	0·32	0·08	55·73
Hazaribagh	Hazaribagh	0·77	1·07	1·01	0·54	2·19	8·29	13·30	12·74	9·04	2·83	0·25	0·22	52·25
Ranchi	Ranchi	0·78	1·55	1·30	1·09	2·29	9·13	15·23	12·88	9·52	2·46	0·22	0·22	56·67
Singbhum	Chaibasa	0·81	1·56	0·95	1·55	3·34	8·46	12·24	11·81	8·82	2·32	0·52	0·24	52·62
Sambhalpur	Sambhalpur	0·38	0·74	0·96	0·72	1·31	10·36	21·37	18·60	9·02	1·87	0·93	0·28	66·54
Cuttack	Cuttack	0·25	0·60	1·03	1·18	3·99	9·84	11·64	14·06	10·09	4·99	1·28	0·35	59·30
Orissa Tributary Mahals	Baripada	0·45	1·05	1·49	2·24	4·59	10·28	13·40	12·13	11·39	4·70	0·69	0·20	62·61
United Provinces														
Gorakhpur	Gorakhpur	0·76	0·53	0·36	0·47	1·42	7·96	13·39	13·86	7·81	3·91	0·15	0·15	50·77
Bahraich	Bahraich	0·89	0·99	0·36	0·38	1·53	6·27	10·82	14·29	7·07	1·69	0·21	0·32	44·82
Allahabad	Allahabad	0·82	0·50	0·22	0·16	0·26	4·92	11·76	12·03	5·39	2·52	0·31	0·27	39·16
Lucknow	Lucknow	0·84	0·57	0·29	0·29	0·88	4·65	11·85	11·27	5·76	1·20	0·10	0·35	38·05
Cawnpore	Cawnpore	0·59	0·63	0·23	0·24	0·28	3·21	10·92	11·81	6·27	1·35	0·29	0·24	36·06
Bareilly	Bareilly	1·05	0·77	0·62	0·29	0·70	5·42	14·02	13·20	6·90	1·38	0·23	0·38	44·96
Jhansi	Jhansi	0·68	0·45	0·27	0·17	0·35	4·87	11·91	11·63	6·14	0·72	0·11	0·27	37·57
Saharanpur	Roorkee	1·59	1·49	0·72	0·47	0·83	5·10	12·36	12·63	5·69	0·57	0·22	0·63	42·39
Aligarh	Aligarh	0·66	0·53	0·47	0·17	0·40	2·51	8·54	7·68	4·29	0·74	0·06	0·39	26·44
Agra	Agra	0·54	0·37	0·26	0·25	0·48	2·51	9·57	8·26	3·85	0·83	0·07	0·33	27·32

Dehra Dun	Dehra Dun	2·27	2·33	0·98	0·70	1·48	8·42	27·0	30·55	9·43	0·89	0·30	0·87	85·22
Dehra Dun	Chakrata	4·19	4·59	2·63	1·59	2·46	7·79	20·22	19·98	6·35	0·82	0·43	1·39	72·44
Naini Tal	Naini Tal	3·15	3·17	2·32	1·21	2·86	13·40	27·45	26·37	11·51	2·44	0·27	1·0	95·15
Garhwal	Lansdowne	3·40	3·45	1·49	1·16	1·81	7·99	25·39	25·42	8·13	1·93	0·25	1·35	81·77
Almora	Almora	2·12	1·85	1·77	1·04	2·11	5·64	10·51	9·81	5·02	1·36	0·15	0·61	41·99
Punjab														
Delhi	Delhi	1·07	0·66	0·47	0·38	0·63	3·10	8·06	7·88	4·40	0·29	0·10	0·48	27·52
Hissar	Sirsa	0·67	0·34	0·35	0·33	0·61	1·65	3·91	3·62	1·97	0·11	0·01	0·31	13·88
Karnal	Kaithal	1·04	0·68	0·46	0·32	0·41	2·26	5·15	3·95	3·35	0·15	0·05	0·28	18·10
Umballa	Umballa	1·57	2·08	0·81	0·51	0·60	3·68	7·88	7·90	3·99	0·23	0·25	0·69	30·19
Patiala State	Patiala	1·31	1·44	1·01	0·45	0·63	2·20	6·43	7·38	3·84	0·29	0·08	0·40	25·46
Jullundur	Jullundur	1·49	1·32	1·05	0·55	0·74	2·59	6·83	7·26	3·99	0·18	0·06	0·74	26·80
Ferozepore	Ferozepore	0·89	0·78	0·68	0·57	0·45	1·70	4·65	4·48	2·51	0·20	0·06	0·25	17·22
Lahore	Lahore	1·06	0·99	0·76	0·50	0·67	1·84	5·49	5·30	2·47	0·16	0·05	0·40	19·69
Rawalpindi	Rawalpindi	2·67	2·29	2·06	1·85	1·42	2·10	8·06	8·82	3·43	0·39	0·23	0·97	34·29
Shahpur	Sargodha	0·45	1·37	0·47	0·90	0·26	1·21	3·18	3·04	2·17	0·0	0·10	0·28	13·43
Lyallpur	Lyallpur	0·42	0·70	0·57	0·49	0·40	1·50	3·67	2·37	2·17	0·07	0·10	0·20	12·66
Multan	Multan	0·39	0·40	0·38	0·20	0·29	0·59	2·04	1·74	0·36	0·01	0·08	0·25	6·73
Dera Ghazi Khan	Runjanpur	0·32	0·37	0·21	0·23	0·32	0·22	0·78	0·89	0·25	0·01	0·03	0·09	3·72
Simla	Simla	2·64	3·31	2·44	1·75	2·68	6·91	16·95	18·16	5·71	0·87	0·45	1·24	63·11
Kangra	Dharamsala	4·98	4·62	3·56	1·77	2·29	9·77	37·40	38·19	11·23	0·83	0·33	1·74	116·71
Kangra	Palampur	4·90	4·88	3·40	1·70	2·08	7·68	30·26	32·01	10·09	1·0	0·29	1·64	99·93
Gurdaspur	Dalhousie	4·69	6·24	4·42	2·81	2·58	5·69	22·23	23·11	7·83	0·72	0·42	2·20	82·94
Rawalpindi	Murree	4·08	4·28	4·37	3·67	2·95	3·50	11·67	14·12	5·91	1·27	0·70	1·45	57·97
Kashmir														
Jummoo	Jummoo	3·01	2·97	1·77	0·88	0·77	2·41	11·41	12·21	4·94	0·14	0·08	1·20	41·79
Jummoo	Punch	5·93	4·93	4·82	3·09	2·51	5·17	10·69	12·88	5·31	0·85	0·39	2·40	58·97
Srinagar	Srinagar	2·98	2·79	3·52	3·65	2·63	1·73	2·87	2·41	1·82	1·08	0·35	1·41	27·24
Srinagar	Sonamarg	11·50	9·48	16·75	10·26	5·82	3·11	4·06	3·38	4·67	1·76	1·18	5·87	77·84
Srinagar	Leh	0·37	0·34	0·30	0·22	0·21	0·17	0·47	0·52	0·28	0·17	0·04	0·17	3·26
Srinagar	Gilgit	0·21	0·21	0·49	1·05	0·94	0·40	0·59	0·45	0·37	0·25	0·04	0·11	5·11
North-West Frontier Province														
Hazara	Abbotabad	3·65	4·10	4·28	3·39	2·39	3·13	8·78	9·60	3·61	1·24	0·75	1·45	46·37
Peshawar	Peshawar	1·64	1·31	2·13	1·78	0·93	0·32	1·42	2·08	0·75	0·12	0·32	0·49	13·29
Wano	Wano	1·33	1·40	3·99	1·37	0·47	0·47	1·59	0·89	0·10	0·04	0·07	0·51	12·23

Province & District.	Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
N.-W. Frontier Prov. (*continued*)														
Dera Ismail Khan	Dera Ismail Khan	0·52	0·71	0·98	0·74	0·42	0·67	2·27	2·10	0·59	0·04	0·12	0·21	9·37
Kurram	Parachinar	2·14	2·01	4·37	3·82	2·76	2·21	3·57	2·83	1·63	0·78	0·48	1·25	27·85
Dir, Swat, and Chitral	Malakand	4·12	3·72	4·76	4·13	0·89	0·56	5·61	10·27	3·69	0·46	0·09	2·04	40·34
	Chitral	1·05	1·14	3·81	3·47	1·97	0·58	0·40	0·32	0·45	0·80	0·41	1·02	15·42
Baluchistan														
Zhob	Fort Sandeman	0·72	1·09	1·76	1·03	0·46	0·73	2·20	1·39	0·05	0·03	0·19	0·40	10·05
Thal Chatiali	Sibi	0·62	0·51	0·41	0·16	0·22	0·41	1·53	1·07	0·25	0·0	0·09	0·42	5·69
Thal Chatiali	Shahrig	1·57	1·83	1·42	0·38	0·37	0·58	2·46	1·80	0·56	0·04	0·40	0·64	12·05
Quetta Pishin	Quetta	1·92	1·99	1·93	1·04	0·38	0·17	0·74	0·45	0·08	0·09	0·29	0·94	10·02
Quetta Pishin	Chaman	1·38	1·55	1·56	0·56	0·11	0·03	0·06	0·02	0·0	0·07	0·22	1·12	6·68
Chagai	Nushki	1·21	1·31	1·29	0·41	0·15	0·02	0·0	0·0	0·0	0·0	0·14	0·88	5·41
Kalat State	Kalat	1·17	1·33	0·94	0·45	0·25	0·31	0·62	0·19	0·0	0·04	0·26	1·18	6·74
Sind														
Upper Sind Frontier	Jacobabad	0·31	0·36	0·23	0·16	0·14	0·16	1·01	1·01	0·08	0·0	0·08	0·11	3·65
Larkana	Sehwan	0·35	0·32	0·13	0·19	0·15	0·53	1·66	1·31	0·31	0·03	0·08	0·09	5·15
Karachi	Karachi	0·62	0·41	0·22	0·16	0·06	0·98	3·12	1·59	0·44	0·0	0·05	0·13	7·78
Thar and Parkar	Amarkot	0·17	0·13	0·15	0·09	0·06	0·56	3·0	2·32	0·96	0·0	0·05	0·04	7·53
Thar and Parkar	Nagar Parkar	0·03	0·22	0·10	0·06	0·06	0·42	5·70	5·27	1·20	0·04	0·10	0·03	13·23
Rajputana														
Jhalawar	Jhalrapatam	0·21	0·30	0·12	0·10	0·40	4·77	13·31	10·63	5·93	0·43	0·18	0·37	36·75
Kotah	Kotah	0·23	0·24	0·08	0·43	0·43	2·70	10·15	8·20	5·04	0·31	0·02	0·29	28·12
Dholpur	Dholpur	0·37	0·35	0·18	0·15	0·25	2·74	9·30	10·04	4·94	0·79	0·06	0·31	29·48
Bhurtpore	Bhurtpore	0·47	0·39	0·24	0·20	0·55	2·52	8·85	8·16	4·47	0·53	0·05	0·28	26·71
Alwar	Alwar	0·53	0·51	0·29	0·20	0·83	3·07	8·81	8·93	4·64	0·73	0·16	0·44	29·14
Jaipur	Jaipur	0·49	0·26	0·32	0·19	0·53	2·05	7·87	8·31	3·42	0·26	0·15	0·22	24·07
Haraoti and Tonk Agency	Tonk	0·25	0·30	0·17	0·09	0·34	2·54	8·75	8·64	3·18	0·42	0·06	0·23	24·97
Bikanir	Bikanir	0·32	0·29	0·22	0·14	0·64	1·43	3·30	3·57	1·26	0·08	0·05	0·19	11·49
Jodhpur	Jodhpur	0·17	0·22	0·06	0·14	0·25	1·23	4·21	4·31	2·40	0·11	0·10	0·14	13·34
Jesalmir	Jesalmir	0·21	0·20	0·15	0·13	0·22	0·69	2·17	2·28	0·83	0·01	0·04	0·07	7·0
Ajmer Merwara	Ajmer	0·39	0·28	0·18	0·20	0·55	2·23	6·98	7·05	2·57	0·22	0·16	0·28	21·09
Udaipur	Udaipur	0·06	0·18	0·07	0·25	0·79	2·74	7·82	6·95	4·27	0·14	0·02	0·11	23·40
Sirohi	Mount Abu	0·29	0·34	0·14	0·15	0·72	5·25	22·96	21·06	8·92	0·59	0·22	0·16	60·80
Gujarat														
Surat	Surat	0·07	0·08	0·02	0·05	0·10	7·94	17·54	7·67	6·05	1·43	0·12	0·05	41·12

Ahmadabad	Ahmadabad	0·02	0·12	0·06	0·03	0·08	4·40	12·18	8·57	3·62	0·35	0·15	0·04	29·62
Palanpur	Deesa	0·13	0·16	0·04	0·03	0·19	1·92	9·61	8·01	3·62	0·21	0·12	0·06	24·10
Kathiawar	Rajkot	0·04	0·13	0·05	0·03	0·17	4·16	11·70	5·91	3·68	0·39	0·23	0·05	26·54
Kathiawar	Veraval	0·01	0·03	0·03	0·0	0·05	3·48	7·70	4·08	1·80	0·37	0·28	0·12	17·95
Cutch	Bhuj	0·07	0·16	0·07	0·09	0·07	1·87	6·65	2·95	1·83	0·24	0·10	0·05	14·15
Central India														
Baghelkhand	Rewah	0·81	0·85	0·28	0·23	0·38	7·13	15·33	14·32	7·18	1·97	0·28	0·33	49·09
Bundelkhand	Bijawar	0·60	0·69	0·22	0·18	0·21	5·42	12·97	13·46	7·45	0·81	0·22	0·40	42·63
Bundelkhand	Jigni	0·27	0·62	0·13	0·07	0·02	3·88	7·30	8·37	4·71	0·01	0·10	0·0	25·48
Gwalior	Gwalior	0·62	0·49	0·08	0·30	0·29	2·95	9·06	12·08	4·96	0·59	0·14	0·32	31·88
Bhopal Agency	Bhopal	0·34	0·21	0·14	0·05	0·29	6·20	15·65	12·74	7·58	0·88	0·36	0·35	44·79
Bhopawar Agency	Barwani	0·06	0·08	0·04	0·05	0·18	3·69	6·77	4·44	4·35	0·95	0·06	0·04	20·71
Central Provinces and Berar														
Raipur	Raipur	0·21	0·65	0·65	0·66	0·92	8·39	14·95	13·07	7·82	1·99	0·42	0·26	49·99
Saugor	Saugor	0·60	0·41	0·31	0·37	0·46	6·93	14·56	13·37	7·32	0·99	0·40	0·53	46·25
Seoni	Seoni	0·50	0·87	0·60	0·50	0·69	8·87	15·87	12·75	9·14	1·76	0·53	0·55	52·63
Nimar	Khandwa	0·24	0·10	0·12	0·13	0·33	5·18	8·93	6·66	6·45	1·07	0·39	0·31	29·91
Nagpur	Nagpur	0·34	0·43	0·50	0·56	0·75	8·71	14·38	11·76	8·57	1·92	0·68	0·56	49·16
Chanda	Chanda	0·23	0·51	0·99	0·65	0·65	7·22	17·14	13·47	9·83	1·69	0·77	0·28	53·43
Feudatory States	Jagdalpur	0·05	0·06	0·37	2·72	2·05	7·64	16·35	15·83	10·36	2·93	0·72	0·45	59·53
Feudatory States	Sirguja	0·95	1·58	0·77	0·34	0·88	9·33	18·55	22·46	7·72	2·37	0·42	0·39	65·76
Hoshangabad	Pachmarhi	0·62	0·56	0·38	0·32	0·55	9·38	23·93	21·78	14·82	1·91	0·52	0·56	75·33
Akola	Akola	0·31	0·24	0·35	0·17	0·37	5·12	10·03	7·03	5·95	2·08	0·43	0·71	32·79
Buldana	Buldana	0·23	0·27	0·19	0·23	0·52	6·43	9·02	7·41	7·35	2·25	0·56	0·59	35·05
Yeotmal	Yeotmal	0·29	0·27	0·42	0·30	0·58	7·26	12·44	8·96	7·06	1·92	0·53	0·46	40·49
Bombay														
West Khandesh	Dhulia	0·23	0·11	0·05	0·06	0·30	5·20	5·53	3·88	5·07	1·52	0·51	0·26	22·72
Nasik	Nasik	0·07	0·05	0·03	0·16	0·75	5·29	9·06	4·99	5·97	3·02	0·34	0·22	29·95
Ahmadnagar	Ahmadnagar	0·13	0·19	0·18	0·34	0·69	5·03	3·39	2·78	6·72	1·89	0·50	0·45	22·29
Poona	Poona	0·06	0·05	0·04	0·60	1·18	4·51	7·43	3·76	4·71	3·88	0·82	0·19	27·23
Sholapur	Sholapur	0·13	0·03	0·20	0·51	0·94	4·79	4·28	5·46	8·40	3·41	0·89	0·46	29·50
Bijapur	Bijapur	0·01	0·04	0·31	0·82	1·09	3·44	2·0	2·73	6·26	3·04	0·89	0·30	20·93
Belgaum	Belgaum	0·10	0·03	0·34	1·74	2·45	8·38	15·97	9·23	4·59	5·03	1·47	0·34	49·67
Dharwar	Hubli	0·10	0·02	0·30	1·67	2·93	4·02	4·43	3·33	3·84	5·32	1·21	0·38	27·55
North Kanara	Karwar	0·07	0·01	0·0	0·57	2·68	38·65	38·98	22·15	11·85	5·64	1·67	0·18	122·45

Province & District.	Station.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
Bombay (*continued*)														
Thana	Bombay	0·09	0·03	0·02	0·06	0·71	18·48	25·17	14·19	10·84	1·84	0·38	0·07	71·88
Kolaba	Matheran	0·09	0·04	0·01	0·11	1·05	33·52	84·22	57·19	26·31	5·16	0·80	0·08	208·58
Satara	Malcolmpeth	0·12	0·05	0·13	1·43	1·75	45·76	112·05	76·25	29·66	5·90	1·40	0·34	274·84
Hyderabad														
Hyderabad	Hyderabad	0·23	0·24	0·64	1·05	0·79	4·47	5·90	6·80	6·92	3·23	0·88	0·17	31·32
Warangal	Hanamkonda	0·45	0·20	0·18	1·04	0·52	5·87	9·50	6·94	7·28	1·90	0·65	0·22	34·75
Nander	Nander	0·10	0·19	0·44	0·46	0·57	5·94	9·08	9·03	8·97	2·37	0·64	0·51	38·30
Aurangabad	Aurangabad	0·27	0·15	0·24	0·27	0·65	5·21	6·66	5·35	7·09	1·70	0·47	0·31	28·37
Naldrug	Usmanabad	0·08	0·04	0·30	0·62	0·95	6·05	5·97	6·89	9·92	2·79	0·60	0·35	34·56
Lingsugar	Lingsugar	0·09	0·02	0·26	0·65	1·20	2·71	2·87	4·23	5·29	3·42	1·10	0·19	22·03
Mysore														
Mysore	Mysore	0·16	0·15	0·20	2·65	5·06	2·90	2·52	3·53	4·59	7·04	2·07	0·43	31·30
Bangalore	Bangalore	0·27	0·18	0·46	1·37	4·34	2·87	4·17	5·49	6·76	6·28	2·83	0·49	35·51
Kolar	Kolar	0·22	0·08	0·34	1·26	3·24	2·66	2·81	4·05	4·85	4·90	3·17	0·78	28·36
Tumkur	Sira	0·11	0·06	0·13	0·92	2·30	2·09	1·83	2·09	4·06	3·73	1·44	0·24	19·0
Chitaldrug	Harihar	0·18	0·03	0·12	1·02	2·53	2·40	2·65	2·59	3·82	3·71	0·87	0·72	20·64
Shimoga	Nagar	0·11	0·0	0·20	1·09	3·18	35·16	59·47	31·12	11·75	6·65	1·74	0·36	150·83
Kadur	Kadur	0·11	0·04	0·32	1·28	3·18	2·51	2·28	1·48	2·38	5·51	1·98	0·98	22·05
Kadur	Sringeri	0·12	0·02	0·24	2·65	2·46	33·22	57·27	33·52	11·36	7·62	2·07	0·96	151·51
Coorg														
Coorg	Mercara	0·17	0·19	0·72	2·60	5·79	25·74	42·28	26·39	10·80	8·62	2·73	0·85	126·88
Madras														
Ganjam	Gopalpur	0·23	0·47	0·57	0·79	1·94	5·83	7·30	7·53	7·53	8·29	3·42	0·97	44·87
Vizagapatam	Jeypore	0·09	0·23	0·51	1·94	2·28	9·86	20·91	21·33	12·92	3·93	1·16	0·28	75·44
Guntur	Guntur	0·32	0·29	0·58	0·52	1·69	4·24	5·12	5·66	5·67	5·45	2·49	0·52	32·55
Kurnool	Kurnool	0·11	0·16	0·28	0·71	0·95	3·17	4·89	5·56	6·41	3·30	1·08	0·30	26·92
Anantapur	Anantapur	0·04	0·07	0·09	0·53	1·65	2·05	2·05	2·80	5·36	4·11	1·38	0·16	20·29
Madras	Madras	0·91	0·33	0·18	0·61	1·08	1·90	4·09	4·94	5·14	11·27	12·78	6·24	49·47
Salem	Salem	0·34	0·32	0·52	2·03	4·90	3·16	3·84	7·25	6·54	6·66	3·54	1·10	40·20
Coimbatore	Coimbatore	0·60	0·37	0·44	1·67	2·47	1·56	1·38	1·22	1·42	6·63	3·19	1·15	22·10
Tinnevelly	Tinnevelly	1·35	0·98	1·06	2·88	1·51	0·51	0·42	0·63	1·24	6·65	6·73	3·33	27·29
Travancore Trivandrum Division	Trivandrum	0·66	0·61	1·70	4·72	8·67	12·97	7·16	4·09	3·83	10·49	6·23	2·20	63·33
Malabar	Cochin	0·64	0·75	2·07	5·21	11·39	28·13	22·88	13·09	8·71	13·06	6·29	1·61	113·83
Madura	Kodaikanal	3·22	1·74	2·15	4·28	5·86	3·86	5·01	7·49	6·52	10·93	6·50	4·09	61·65
The Nilgiris	Ootacamund	2·07	0·71	0·85	2·40	7·84	6·10	9·02	6·67	5·76	8·71	3·79	2·28	56·20

INDEX

Abbotabad, 63, 489.
Abdali tribe, 333.
Abd-al-Kuri, 335, 337.
Abd-er-Razzak, 319.
Aberdeen, 443.
Abhayagiriya dagoba, 366.
Abor Hills, 200.
Abu, Mount, 64, 292, 490.
Abu Abd-Allah Muhammad: *see* Ibn Batuta.
Abu Bakr, 238.
Abyssinia: possession of Aden, 333; relation of weather to that of India, 72.
Adam's Peak, 339.
Addu, 315, 317, 319, 320, 323, 339.
Aden, 329; administration, 253, 284; annexation, 283; climate, 330, 333; communications, 332; fauna, 333; flora, 332; government, 334; harbour, 330, 331; history, 333; population, 333, 470, 472; trade, 330, 333, 334, 468, 472.
Aden, Gulf of, 335.
Afghanistan: mountains, 1, 19; rivers, 16; trade with India, 155, 176, 468.
Agaria tribe, 212.
Agassiz, Professor Alexander, 321.
Agate, 149.
Agatti, 327.
Agra, 62, 156, 157, 272, 454, 488.
Agra Province, 254, 252, 270, 272, 470; *see also* United Provinces.
Ahli Hadis, 238.
Ahmadabad, 65, 140, 163, 283, 454, 490.
Ahmadnagar, 283, 491.
Ahom literature, 192.
Aimol Old Kuki tribe, 209.
Ajmer, 64, 273, 463, 470, 490.
Ajmer (town), 174, 454.
Akbar, 245, 263.
Akola, 166, 279, 491.
Al (vegetable dye), 133.
Alberuni, 318.
Alexandrite, 343.
Ali, 238.
Aligarh, 62, 272, 454, 488.
Allahabad, 62, 96, 271, 272, 454, 488.
Almora, 272, 489.
Almora Kanawar, 190.
Alor Star, 461.
Alwar, 246, 292, 490.
Amarkantak, 6.
Ambala: *see* Umballa.
Amber: *see* Jaipur.
Ameni, 327.
Amethyst, 343.
Amil, 250.
Amraoti, 6, 65, 172, 279.
Amritsar, 154, 156, 236, 275, 455.
Anamalai mts., 4, 210.
Anantapur, 143, 280, 492.
Andalusite, 343.
Andaman Islands, 30, 299, 464, 470; administration, 253, 289; customs, 209, 215; history, 289; language, 196; religion, 107, 216.
Androth, 327.
Anglo-Indian: *see* Eurasian.
Angul, 269.
Animism, 198, 203, 296, 301, 410, 471.
Anjengo district, 249, 281.
Anjidiv, 294.
Annaprasana rite, 206.
Anteater, 105.
Antelope, 103.
Antimony, 432.
Anuloma (custom), 203.
Anuradhapura, 355, 362, 365, 366.
Anyavarta, 195.
Apes, 418.
Aplichau I., 443.
Arabia, 329; British sphere of influence, 330; climate, 330; geology, 329; population, 330; products, 331; religion, 331; trade, 324, 330, 336; Turkish sphere of influence, 330.
Arabian Gulf, 14.
Arabian Sea, 12, 38, 45, 47, 50, 69, 116.
Arabs, in Aden, 333; Ceylon, 338, 360; S. Arabia, 331.
Arakan, 58, 266, 287.
Arakanese language, 191.
Arakan Yoma Mts., 1, 30, 31, 38.
Aravali Mts., 4, 6, 10, 36, 39, 64, 273.
Arcot, 210, 280, 295.
Areca: *see* Betel.
Armenians, in India, 306.
Aryan language, 363.
Arya Samaj, 225, 228.
Assam, 12, 265, 266, 463; administration, 253, 254, 258, 265; climate, 43, 45, 47, 53, 58, 81, 115, 117, 487; customs, 199, 200, 203, 212, 215; fauna, 94, 101; industries, 150, 151, 153; land tenure, 118; language, 190, 192, 195; minerals, 148, 465; mountains, 15, 19, 38; population, 470; religion, 207, 227, 231; rivers, 26, 32; tea, 133; vegetation, 79.
Atith tribe, 215.
Atoll, 314, 316, 327, 436, 438.
Attock, 275.
Aurangzeb, 245, 301.
Avatar, 232.
Ayyar Brahmans, 212.
Azamgarh, 272.

Baba race, 411.
Bab-el-Jehannum, 332.
Bab-el-Mandeb, Straits of, 330, 334.
Badaga tribe, 198.
Badger, 99.
Badulla, 341, 353, 357.
Baganapalle, 282.
Bajra (millet), 129.
Bagraha: *see* Bogra.
Bahawalpur, 246, 276.
Bahraich, 272, 488.
Bahrein Islands, 337, 486.
Baidya tribe, 217.
Baitarani River, 269.
Bajaur, 176, 468.
Bakarganj, 263, 487; cyclone, 51.
Balaghat, 64, 279.
Balasore, 269, 295.
Ballabgarh, 276.
Ballia, 272.
Baloch tribe, 202.
Baltistan, 190.
Baluchistan, 115, 285, 471; administration, 286; climate, 56, 68, 72, 490; customs, 199, 204, 210, 212; fauna, 98; history, 285; language, 193; minerals, 144, 465; mountains, 1, 19; population, 470; religion, 239, 471.
Bamboo: Brit. Malaya, 380; Ceylon, 345; India, 78, 81, 84.
Banana, 381.
Banda, 272.
Bander Saleh Bay, 337.
Bangalore, 234, 285, 292, 455.

Bangkok, 401.
Bankot, 282.
Bankura, 59, 60, 263.
Bannu, 277.
Banyan, 317: *see also* Waniya.
Bara Banki, 152, 272.
Barah River, 15.
Barakar, 160.
Baram River, 385, 417, 419.
Baramba, 234.
Bareilly, 272, 455, 488.
Barhanpur, 6.
Barley, 129, 173, 464.
Barnes, Sir Edward, 351, 357.
Baroda, 140, 202, 208, 246, 291; administration, 291; customs, 212, 214; history, 291; population, 470; religion, 236.
Baroda (town), 455.
Barren Island, 33.
Basel Mission, 159.
Basevi tribe, 210.
Bashahr, 198.
Bastar, 279.
Basti, 272.
Bat: Ceylon, 348; fruit-eating, Maldive Archipelago, 318; India, 100.
Batang Lupar River, 417.
Batticaloa, 352, 460.
Bauri caste, 146.
Baw, 394.
Bear, 99.
Bear-cat, 97.
Beawar, 274.
Beejapore: *see* Bijapur.
Belgaum, 283, 491.
Bellary, 67, 280, 282.
Benares, 62, 153, 154, 161, 265, 270, 272, 273, 455.
Bengal, 12, 263, 463; administration, 255, 264; agriculture, 122, 127, 130, 132, 463; climate, 45, 46, 47, 50, 51, 53, 59, 70, 81, 116, 117, 487; customs, 204, 215; forests, 83; history, 244, 245, 252, 263, 265, 270, 287, 412; industries, 141, 152, 158, 164, 160, 167; irrigation, 126, 127; labour, 120, 146; land tenure, 118; languages, 197; minerals, 143, 145, 465; partition, 266; population, 114, 470; religions, 227, 238; trade, 175, 319.
Bengal, Bay of, 5, 6, 14, 19, 33, 45, 47; climate, 50, 69, 73, 116.
Bengal gneiss, 35.
Bengali language, 195.
Ben-i-Israil, 240.
Berar, 43, 50, 64, 279, 463; administration, 279; agriculture, 131; climate, 57, 491; history, 278, 279; industries, 166; population, 470; trade, 172.
Berhampore, 60, 488.
Beri-beri, 443.
Bernam River, 374.
Beryl: Ceylon, 343; India, 149.
Besut River, 374.
Betel: Br. Malaya, 381, 389, 483; Ceylon, 353, 364, 389; India, 133, 174.
Betul, 279.
Bghai language, 193.
Bhabar, 15.
Bhagalpur, 267, 455.
Bhaiyadi, 203.
Bhakti, 226.
Bhamo, 58, 487.
Bhandara, 64, 279.
Bharal, 102.
Bharatpur: *see* Bhurtpore.
Bharoch: *see* Broach.
Bharvad tribe, 214.
Bholla tribe, 215.
Bhopal, 247, 293; geology, 7.
Bhopal (town), 455, 491.
Bhotia, 216.
Bhurtpore, 247, 490.
Bhutan, 246, 290.
Bias River, 17, 274.
Bibaha rite, 207.
Bihar, 12, 267; administration, 254, 258; agriculture, 132, 463; climate, 45, 47, 50, 51, 53, 60, 488; history, 245, 252, 265; industries, 166; labour, 164; minerals, 145, 147, 149.
Bihari language, 195.
Bijapur, 283, 491.
Bijawar system, 35.
Bijnor, 272.
Bikanir, 11, 64, 247, 292, 490; fauna, 101.
Bilaspur, 279.
Biloch language, 193.
Birbhum, 263.
Birds' nests, edible, 430.
Bitra, 327.
Blackbuck, 103.
Blanford, W. T., 70, 94.
Blukar, 380.
Bo, tree, 367.
Bodh Gaya, 228.
Bodo language, 190.
Bogra, 263, 488.
Bohra caste, 139.
Bombay City, 163, 283, 455; trade, 131, 170, 466, 492.
Bombay Presidency, 150, 245, 247, 260, 282, 463; administration, 255, 280, 284; agriculture, 123, 128, 463; climate, 56, 65, 116, 491; customs, 208, 210, 214; government of Aden, 334; history, 244, 245, 252, 282; industries, 157, 160, 163, 167; irrigation, 126; labour, 120; land tenure, 118; language, 193; population, 470; religion, 236, 240; trade, 139, 175, 330.
Bonai, 268.
Bonito, 325.
Borneo, British, 373, 415; agriculture, 419; climate, 416; currency, 434; customs, 419; economic conditions, 430; fauna, 282, 417; geology, 415, 418; industries, 419; manufactures, 432; minerals, 432; mountains, 415; natural products, 430; population, 418, 421; religion, 420; 429; rivers, 417; trade, 433, 444; transport, 432; vegetation, 416, 417; *see also* British North Borneo, *and other divisions*.
Borneo Company, 431, 434.
Botanic Gardens, Ceylon, 349, 353.
Brahma, 227.
Brahmachari (life period), 207.
Brahmani River, 269.
Brahmans, 119, 138, 200, 204, 211, 229, 232, 234; navigation, 168; settlement, 243.
Brahmaputra River, 12, 14, 15, 17, 18, 26, 32, 59, 115.
Brahmo Samaj, 228.
Brahui language, 197.
Brahui tribe, 199, 202, 212.
Brandis, Sir D., 80.
Brazen Palace, Ceylon, 367.
Breadfruit, 323.
British India Steamship Co., 358.
British North Borneo: agricultural products, 388, 392; arts, 400; climate, 377; communications, 398, 400, 403, 433; fisheries, 398; government, 428; harbours, 433; history, 422, 423; industries, 397; minerals, 396, 483; population, 408, 410, 483; trade, 401, 433, 483; vegetation, 379.
British North Borneo Co., 373, 415, 423.
Broach, 123, 283.
Brooke, Rajah Sir Charles, 423.
Brooke, Rajah Sir James, 421, 423, 424, 434.
Brooketown, 432, 484.
Bruni, 373, 416, 461, 484; coal, 396; fisheries, 398; government, 416, 422, 424, 429; revenue, 435; trade, 434.
Budaun, 272.

Buddhists: Ceylon, 362, 365, 476; India, 198, 204, 232, 303, 471.
Buffalo: Ceylon, 347; India, 101.
Bugti language, 193.
Bulandshahr, 62, 272.
Buldana, 279, 491.
Bund, Ceylon, 354.
Bundelkhand, 35, 266, 270, 491.
Burdwan, 60, 263, 488.
Burghers, Ceylon, 361.
Burhanpur, 153.
Burma, 1, 31, 247, 252, 254, 287; agriculture, 119, 127, 133, 463; administration, 254, 259, 288; climate, 42, 45, 47, 51, 53, 58, 81, 116, 117, 487; customs, 199, 202, 209, 212, 213, 215; fauna, 94, 97, 102, 104; forests, 82, 101; geology, 31, 39, 40; history, 287; industries, 151, 154, 159, 161; land tenure, 118; language, 190, 193; minerals, 142, 144, 147, 149, 465; mountains, 33; population, 114, 139, 233, 470; religion, 232, 303; trade, 175; vegetation, 77; women, 308.
Buxar, 59, 488.
Byramgore, 327.

Cacao, 353.
Cachar, 18, 59, 79, 213, 265, 487.
Calcutta, 59, 140, 150, 260, 263, 266, 456; coal, 145; industries, 158; rainfall, 488; trade, 140, 157, 164, 169, 324, 329, 466.
Calicut, 243, 456.
Cambay, 149.
Cambay, Gulf of, 5.
Camphor, 392, 430.
Canals, 124.
Cananore, 320, 324, 328.
Canton River, 439.
Cantonese, 446.
Cape of Good Hope: trade route, 339.
Carbuncle, 343.
Cardamoms: Ceylon, 353; India, 133.
Carnatic: agriculture, 121; climate, 50, 67; forests, 82; history, 244, 280.
Carpets: India, 156.
Casuarina, 382.
Caste system, 13, 200, 297, 309, 363.
Catechu, 389.
Castor oil plant, 111.
Cat's eye, 343.
Cattle: British Malaya, 387; India, 113, 134, 463.
Cauvery Falls, 140.
Cauvery River, 5.
Cavendish-Bentinck, Lord William, 253, 285, 309.
Cawnpore, 157, 166, 272, 456, 488.
Cement: India, 150.
Central India, 247, 293, 463, 465; administration, 293; climate, 43, 47, 50, 51, 53, 64, 491; customs, 215.
Central Provinces, 268, 269, 278; administration, 254, 278; agriculture, 121, 128; cattle, 135, 463; climate, 43, 47, 50, 53, 64, 491; fauna, 104; history, 278; industries, 160; minerals, 144, 145, 465; population, 114, 470.
Ceylon, 338, 473; agriculture, 340, 349, 357, 473; agricultural products, 341, 349; civil service, 369; climate, 343, 362; communications, 352, 356, 473; connexion with Maldives, 319, 320, 324; education, 365; fauna, 94, 346; geology, 341; government, 367; history, 320, 338, 362, 365, 439; intercourse with India, 367; irrigation, 352, 354; minerals, 342, 473; mining, 356; mountains, 339; natives of, 362; population, 359, 474; precious stones, 342; railways, 339, 357, 473; religion, 362; rivers, 339; shipping, 356, 358, 474; towns, 460; trade, 145, 153, 324, 358, 468, 474; vegetation, 344.
Chadar, 155.
Chagos Archipelago, 315.
Chaitanya, 227.
Chakrata, 54, 488.
Chaman, 43, 56, 490.
Chamar caste, 157.
Chamba, 190, 276.
Chambal River, 5.
Champaran, 267, 488.
Chanda, 64, 279, 491.
Chandavand (division of property), 199.
Chandernagore, 295.
Chang Bhakar, 268.
Chappar Rift, 19.
Chawte tribe, 202.
Chedong, 386.
Chena, system, 346, 350.
Chenab River, 17, 274.
Chengchi-shan, Mount: *see* Macdonald, Mount.
Cherbaniani, 327.
Cherrapunji, 19, 65, 59, 115, 487.
Chetlat, 327.
Chettis: Ceylon, 361; India, 139.
Chhattisgarh, 36, 279.
Chhindwara, 279.
Chifu, 450.
Chikan work, 156.
Chilaw, 353, 358.
Chillies, 133.
Chindwin, Upper, 33, 58.
China, language, 389.
China: trade with Hong Kong, 444; India, 162.
China Sea, 375.
Chindwin River, 31.
Chinese in Borneo, 421, 422, 430, 432, 434; British Malaya, 385, 387, 388, 394, 399, 407, 411, 446; Ceylon, 338; Christmas Island, 437; Hawaii, 446; Sarawak, 425.
Chingleput district, 280.
Chin Hills, 288, 289, 487.
Chinkara, 103.
Chin tribe, 212, 216.
Chiru tribe, 202.
Chitaldrug, 66.
Chitichun Pass, 28.
Chitral, 277, 490.
Chittagong, 60, 79, 169, 263, 324, 329, 466, 487.
Chittagong Hill Tracts, 252, 263, 264.
Chota Nagpur, 266, 268; climate, 50, 53, 60; customs, 214; geology, 116; religion, 207.
Christianity in India, 239, 301, 308, 471.
Christmas Island, 373, 435; climate, 377, 437; fauna, 437; flora, 382; geology, 436; history, 436; population, 437, 478; products, 392; trade, 404; vegetation, 437.
Christmas Island Phosphate Co., 436.
Chromite, 144.
Chrysoberyl, 343.
Chulakarma rite, 207.
Chunam, 150.
Clive, 268.
Coal: Brit. Borneo, 432, 483; Brit. Malaya, 396, 476; Hong Kong, 444; India, 37, 145, 465; S. Arabia, 330.
Cocanada, 57.
Cochin, 199, 240, 246, 282, 363, 470, 492.
Coco-nut: Brit. Borneo, 431; Brit. Malaya, 381, 386, 387, 399, 483; Ceylon, 351, 352; Cocos-Keeling Islands, 382, 388, 438; India, 133; Laccadive Archip., 328; Maldive Archip., 317, 323, 324; Minikoi, 329.
Cocos-Keeling Islands, 373, 436; fauna, 438; flora, 382, 438; government,

289, 439; population, 438, 478; rainfall, 377; settlement, 466.
Coffee: Brit. Malaya, 390; Ceylon, 351, 357; India, 134, 464.
Coimbatore, 2, 281, 456, 492.
Coir: Brit. Malaya, 400; Ceylon, 352; Maldive Archipelago, 323, 324.
Colombo, 341, 343, 356, 358, 461.
Colombo Museum, 366.
Commander-in-chief: India, 260.
Commissioner of division: India, 253.
Comorin, Cape, 70.
Confucianism, 453.
Conjeeveram Weavers' Union, 152.
Cooch Behar, 191, 247, 264, 488.
Co-operative credit societies: India, 137.
Coorg, 134, 249, 254, 285, 463, 470, 492.
Copper: India, 144, 161.
Copra: Brit. Borneo, 431; Brit. Malaya, 388, 399, 405; Ceylon, 352.
Coral reefs, 314, 317, 321, 328, 334, 438.
Cordierite, 343.
Cornelian, 149.
Cornwallis, Lord, 244, 261.
Coromandel Coast, 50, 117, 319.
Cosmos: allusion to Maldives, 318.
Cotta, 362.
Cotton: Brit. Malaya, 392; India, 115, 122, 123, 131, 136, 140, 151, 161, 172, 175, 464.
Cotton-seed: India, 130, 166.
Cotton-spinning: Hong Kong, 445.
Couvade: India, 208.
Crocodile: Ceylon, 348; India, 108.
Cuddapah, 35, 210, 280.
Curzon, Lord, 265, 276, 279.
Cutch, 12, 37, 50, 101, 284, 491.
Cutch: Brit. Borneo, 432.
Cuttack, 60, 234, 266, 269, 456, 488.

Dacca, 18, 153, 156, 263, 264, 457, 487.
Dafla Hills, 200.
Dalhousie, Lord, 168, 258.
Daman, 294.
Damar, 392.
Dambadeniya, 362.
Damoh, 278.
Dampier, William, 436.
Damuda River, 6.
Damuda series, 37.
Danes: in India, 294.
Darbhanga, 267, 488.
Darjiling, 54, 134, 267, 269, 488.
Darrang, 265, 487.
Darsa, 335, 337.
Darvel Bay, 390.
Darwin, Charles, 315, 438.
Darya Das, 228.
Date: Sokotra, 336; Southern Arabia, 331.
Datia, 293.
Datu, Cape, 416.
Daulat Rao Sindia, 273.
Dayabhaga (school of law), 205.
Dayak tribes, 410.
Deccan, 2, 243; agriculture, 119, 120; ancient connexion with Ceylon, 341; climate, 43, 50, 51, 65, 67, 80, 116; fauna, 103; irrigation, 124; religion, 231, 238; stone, 150; vegetation, 7, 77.
Deccan traps, 6, 9, 39, 115.
Deep Bay, 439, 445.
Deep Water Bay, 443.
Deer, barking: India, 103; Ceylon, 347; hog: India, 104; musk: India, 104; spotted: India, 104; swamp: India, 104.
Deesa, 65, 490.
Dehra Dun, 62, 272, 488.
Dehwari language, 193.
Delhi, 157, 161, 263, 457, 489.
Delhi Province, 249, 254, 270, 276; administration, 276; history, 274, 276.
Dent, Alfred, 423.
Dera Ghazi Khan, 62, 275, 489.
Dera Ismail Khan, 63, 277, 490.
Deshashtha Brahmans, 209.
Deuri Chutiya language, 191.
Devas, 229.
Devatas, 229.
Devis, 229.
Devkaj (custom), 204.
Dev Samaj, 228.
Dewas, 293.
Dhar, 293.
Dharma, 234.
Dharwar, 35, 283, 491.
Dhubri, 59.
Dhundias, 235.
Diamonds, 149.
Digambaras, 235.
Dinajpur, 263, 476.
Dindings, 373, 408.
Dir, 176, 277.
Diu, 294.
Diwa-Mahal, 319.
Diwan (minister), 291.
Doab, 124, 194.
Dog, wild, 97.
Domb, tribe, 207.
Dombki language, 193.
Dras, 54.
Dravidian languages, 196, 363; people, 409.
Drug, 279.
Dugong, 333.
Dujana, 276.
Durand line, 277.
Durbar, Imperial, 265.
Durien, 381.
Dusun: Malaya, 381, 391.
Dusun tribe, 421.
Dutch: in Borneo, 416; Ceylon, 338, 357; India, 294; Malaya, 403.
Dwars, Western, 134.
Dyeing, 154.

East India Co., 139, 244, 247, 255, 257, 261, 265, 279, 280, 296, 406, 411.
Ebony: Ceylon, 346; India, 84.
Elephant: Brit. Borneo, 417; Brit. Malaya, 383; Ceylon, 347; India, 101.
Elikalpeni, 327.
Embroidery, 156.
Emerald, 343.
En, tribe, 189.
Endau River, 374.
Equatorial Channel, 315.
Eranian languages, 193.
Etah, 272.
Etawah, 272.
Eurasians, 306, 359, 408.
Everest, Mount, 22, 23.

Famine, India, 49, 113.
Famine Commissioners, Indian, 74.
Faridkot, 276.
Faridpur, 263.
Farrukhabad, 272.
Farum, 337.
Fatehpur, 272.
Federated Malay States, 402, 405, 407, 412, 479; *see also separate states, and* Malay Peninsula.
Felspar, 343.
Ferozepore, 275, 489.
Flour mills: India, 165.
Flying Fish Cove, 436, 437.
Flying-fox, 100.
Fort St. George, 280.
Fort Victoria: *see* Bankot.
Fort William: *see* Bengal.
Fox, 96.
French, in India, 294.
Fruit: Brit. Malaya, 381, 476; Hong Kong, 444; India, 133; Wei-hai-wei, 450.
Fua Mulaku, 315, 319.
Fyzabad, 272, 457.

Gadabas, 202, 213.
Gadawara, 6.
Gaekwar of Baroda, 291.

Galle, 341, 358, 461.
Gambir, 389.
Ganges River, 1, 5, 6, 12, 14, 17, 40, 215; navigation, 168; settlement, 243.
Gangetic plain: agriculture, 118; cattle, 135; climate, 44, 46, 53, 59, 69, 78, 116; population, 113; vegetation, 77.
Gangpur, 268.
Ganjam, 280, 282, 492.
Gansabhawa, 369.
Gantur, 280.
Garhwal, 15, 22, 36, 39, 272, 489.
Garnet: Ceylon, 343; India, 149.
Garo Hills, 19, 265; language, 191; people, 199, 207, 212, 216.
Gaur, 101.
Gaya, 60, 267, 268, 457.
Georgetown, 461.
Ghalchah languages, 193.
Ghang, 319.
Ghats, the, 5, 45, 56, 66, 126, 164; Eastern, 3; Western, 2, 3, 5, 81, 245.
Ghazi Hassan Izzuddin, 320.
Ghazipur, 270, 272.
Ghi, 336.
Gilgit, 54, 291, 489.
Gishin, Sultan of, 336.
Ginger, 445.
Gnyan, 226.
Goa, 229, 243, 294.
Goalando, 18.
Goalpara, 191, 265, 487.
Goat, 102.
Godavari River, 5, 280, 282.
Gogola, 294.
Goifurfehendu, 320.
Gold: Brit. Borneo, 431; Brit. Malaya, 393, 479, 482; India, 142, 465; Mysore, 35, 465; Wei-hai-wei, 450.
Golden Chersonese, 393.
Gonda, 272.
Gonds, 212.
Gondwana system, 37, 38.
Goos, Pieter, 436.
Gorakhpur, 270, 272, 488.
Gorjis, 235.
Gotra (clan), 202.
Governor-general: India, 255.
Gram, 122, 129, 173.
Gramdevata, 229.
Graphite: *see* Plumbago.
Grihastha (life-period), 207.
Ground nut: India, 130; Wei-hai-wei, 450.
Guano, 337, 396, 438.
Gujranwala, 159, 275.
Gujarat, 45, 115, 139, 247, 275, 291; administration, 284; agriculture, 131; cattle, 134; climate, 50, 52, 55, 65, 490; industries, 154; land tenure, 118.
Gujarati language, 195.
Gunong Tahan, mt., 374.
Gur (unrefined sugar), 131, 166.
Gural, 103.
Gurdaspur, 275, 489.
Gurgaon, 275.
Guru Govind Singh, 236.
Gurus, 235, 236.
Gutta-percha: Brit. Borneo, 430; Brit. Malaya, 392.
Gwalior, 7, 156, 246, 293, 491.

Habura tribe, 202.
Haddumati, 315.
Hadis, 238.
Hagier Mts., 335.
Hakimzila, 229.
Hakka tribe, 446.
Hambali, 238.
Hambantota, 347.
Hamilton, Buchanan, 9.
Hamirpur, 272.
Hanafi, 238.
Harda, 5.
Hardoi, 272.
Hare, 100.
Hasala tribe, 216.
Hasan, 238.
Hassan, 66.
Hastings, Marquess of, 247.
Hastings, Warren, 244, 255, 270.
Hawking: India, 106.
Hazara, 194, 277, 489.
Hazaribagh, 61, 236, 268, 488.
Hibiscus bark, 323.
Hill Tippera, 264.
Himalaya Mts., 1, 15, 17, 19, 22, 30, 242; climate, 47, 54, 59, 69, 72, 92; drainage, 17, 25; fauna, 94, 96, 99, 104, 418; geology, 23, 36, 38; languages, 190; products, 134, 150, 155; vegetation, 76, 80.
Hinayana, school of, 234.
Hindi languages, 194.
Hindostani language, 195.
Hinduism, 207, 225, 296, 300.
Hindu Kush Mts., 22, 25, 30.
Hindus, 198, 204, 209, 211, 213, 215, 471, 475, 478.
Hindustan, 2.
Hindu traders, 171.
Hipparchus, 338.
Hissar, 275, 489.
Hodeida, 333.
Holkar's dominions: *see* Indore.
Hong Kong, 439, 485; climate, 441; communications, 445, 485; defence, 447; education, 447; fisheries, 445; geology, 441; government, 446; harbours, 443; industries, 444; population, 445, 485; public health, 442, 447; trade, 443, 468, 485.
Hong Kong University, 448.
Hooghly, 263, 269.
Hooghly River, 6, 164, 169.
Hooker, Sir J. D., 77, 80.
Horse, wild, 101.
Hoshangabad, 279, 491.
Hoshiarpur, 275.
Howrah, 263.
Hunter, Sir William, 239.
Husain Nika, 239.
Hussein, 238.
Hutti, 143.
Hyaena, 97.
Hyderabad, 244, 279, 283, 291, 463; administration, 249, 291; climate, 43, 50, 51, 63, 65, 492; history, 291; irrigation, 127; population, 246, 470.
Hyderabad (city), 457, 492.
Hyder Ali, 244.

Ibans: *see* Sea Dayaks.
Ibex, 102.
Ibn Batuta, 318.
Ids, the, 239.
Iluvan tribe, 198.
India: agriculture, 84, 113, 117, 138, 463; British occupation, 243; burial customs, 214; caste system, 200; climate, 41, 52, 68, 76, 92, 115; coal, 37; currency, 176; defence, military, 259, 467; defence, naval, 260; education, 303, 310; exports, 172, 467; fauna, 94, 347; forests, 81, 86, 464; geology, 1, 3, 5, 6, 18, 34; government, 248, 256; harbours, 169; history, 296; imports, 173, 467; industries, 15, 138; initiation rites, 210; irrigation, 124; judicature, 259; labour, 119, 146, 163; land tenure, 117; law, 205, 248, 257; local government, 254; manufactures, 140, 166, 466; marriage customs, 197, 210; minerals, 142, 465; mountains, 2, 19; native states, 246; physical geography, 1, 115, 242; political geography, 244; population, 119, 305, 469; public health, 311; railways, 167, 466; rainfall, 44, 67, 80, 116, 487; religion, 197, 296, 300, 471; rights of property, 205; rivers, 5, 12, 16, 31; shipping, 170, 466; social conditions, 303, 310; soils,

115; towns, 58; trade, 139, 164, 170, 468; transport, 90, 167; water-supply, 85; western influence, 296; women, 308.
Indigo, 132, 155, 464.
Indian Civil Service, 261, 255.
Indian Forest Service, 91.
Indian Mutiny, 296.
Indian Ocean, 5, 45, 68, 71, 314, 315, 330.
Indians: in Aden, 333; Brit. Malaya, 408, 411, 481; Ceylon, 361, 475; Hong Kong, 446.
Indo-Aryan languages, 194, 196.
Indo-Chinese languages, 190.
Indo-European languages, 193.
Indo-Gangetic plain, 12, 38, 115, 124.
Indore, 64, 246, 293.
Indore (town), 457.
Indus River, 1, 12, 16, 19, 26, 29, 30, 40; settlement, 13, 243; navigation, 168; vegetation, 78.
Iran Mts., 416.
Irawadi River, 1, 26, 31, 33, 40, 80, 115; delta, 193; early emigration to Borneo, 421; gold, 142; oil, 147.
Irawadi division, 288.
Iron: Ceylon, 342; India, 143, 160.
Irrigation: Ceylon, 354; India, 113, 124.
Izhava tribe, 215.

Jackal, 98.
Jacobabad, 16, 43, 55, 63, 490.
Jadeite, 149.
Jaffna, 341, 350, 352, 353, 355, 461.
Jagir, 280.
Jagri: *see* Gur.
Jains, 140, 204, 234, 303, 471.
Jaintia Hills, 265.
Jaipur, 64, 161, 246, 292, 490.
Jaipur (town), 457.
Jaisalmer: *see* Jesalmir.
Jakun tribe, 409.
Jalandhar: *see* Jullundur.
Jalaun, 272.
Jalpaiguri, 60, 191, 263, 488.
Jamu: *see* Jummoo.
Jamuna River, 18.
Jaora, 293.
Japan, trade with India, 131.
Jashpur, 268.
Jatapu tribe, 215.
Jatakarma rite, 206.
Jaunpur, 272.
Java: affinity of vegetation with Cocos-Keeling Is., 382; conquest, 406; resemblance of fauna to that of Borneo, 418; trade, 174, 175, 434, 444.
Jebel Ihsan, 331, 333.
Jebel Shamshan, 332, 333.
Jelutong, 432.
Jesalmir, 11, 490.
Jesselton, 433.
Jessore, 263.
Jews: in Aden, 333; India, 240, 306.
Jhano, 275.
Jhansi, 62, 272, 488.
Jhelum, 275.
Jhelum River, 17, 25, 274.
Jinns, 239.
Jodhpur, 246, 273, 292, 490.
Johor, 373; climate, 375; geology, 374; population, 408, 483; railways, 402, 483; rubber, 390, 483; trade, 405, 483; vegetation, 380.
Jones, Wood, 438.
Jowar (millet), 129, 464.
Jubbulpore, 278, 457.
Julaha caste, 163.
Jullundur, 275, 489.
Jummoo, 246, 290, 489.
Jumna River, 14, 17.
Jute, 117, 122, 132, 161, 164, 173, 464.

Kabir, 228.
Kabuk: *see* Laterite.
Kabul, trade with India, 176.
Kabul River, 16.
Kachari language, 191.
Kachari tribe, 203, 207.
Kachin Hills, 288, 289.
Kachin language, 190.
Kachin tribe, 202, 209, 212, 216, 225.
Kachh: *see* Cutch.
Kadayan tribe, 410.
Kadhup, 336.
Kadir tribe, 210.
Kadur, 66.
Kadwa Kambi tribe, 214.
Kafiristan, 194.
Kaimur Hills, 4.
Kaira, 283.
Kaghazi, 158.
Kalabagh, 148.
Kalabit tribe, 421.
Kalat, 286, 287, 490.
Kalawewa, 354.
Kalimah, 238.
Kallan, tribe, 213.
Kallansiya, 336.
Kalpeni, 327.
Kalsia, 276.
Kalu-ganga River, 339.
Kalu-oya River, 355.
Kambodians, 410.
Kamgar Hitwardak Sabha, 163.
Kammalan tribe, 198.
Kamrup, 265, 487.
Kanara, 199, 281, 283, 328, 491.
Kanaur, 216.
Kanarese language, 184, 186, 236.
Kandahar, trade with India, 176.
Kandy, 341, 343, 350, 353, 357, 360, 362, 461.
Kangra, 190, 275, 489.
Kanjar tribe, 202.
Kankar, 150.
Kaolin, 342.
Kapuas Mts., 416.
Kapurthala, 276.
Karachi, 63, 129, 170, 175, 283, 457, 466, 490.
Kardamat, 327.
Karen languages, 192; tribes, 202, 209, 212.
Karenni states, 193, 288, 289.
Karikal, 295.
Karma, 226, 233.
Karnabhed rite, 207.
Karnal, 275, 489.
Karnul: *see* Kurnool.
Karnul series, 36.
Kasera (brass and copper worker), 160.
Kashmir, 22, 28, 246, 290; administration, 290; climate, 54; customs, 198, 199, 212, 214; fauna, 98, 103; geology, 25, 38; industries, 140, 151, 154, 155, 157; population, 470; religion, 227, 238.
Kashmiri language, 194.
Kashmir Lake, 25.
Kasyapa, King, 267.
Katak: *see* Cuttack.
Kathiawar, 12, 45, 63, 150, 157, 247, 248, 284, 291, 294, 491; geology, 7, 9.
Katni, 151.
Kavaratti, 327.
Kayan tribe, 419, 421, 426.
Kayu Glam (tree), 381.
Kazi (native title), 319, 322.
Kedah, 374, 482; climate, 375; communications, 401, 402; products, 386, 391, 396, 405.
Kedah River, 374.
Keeling, Capt., 438.
Kelani valley, 358.
Kelani-ganga River, 339.
Kelantan, 374, 380, 482; gold-mining, 393; population, 411; products, 386, 391, 405; railways, 402; rainfall, 377.
Kelantan River, 374.
Kemaman River, 374.
Kenyah tribe, 419.
Kerosene, 148, 166.
Kesdharis, 236.
Khaibar: *see* Khyber.

Khairpur, 285.
Khalsa Diwans, 236.
Khamti, 192; literature, 193.
Khandagiri, 236.
Khandesh, 45, 50, 283, 491.
Khandhadiyo (marriage custom), 212.
Kharif (winter harvest), 117, 121.
Kharsawan, 268.
Khasi Hills, 19, 59, 150, 265, 487.
Khasi language, 189, 190.
Khasi tribe, 199, 210, 215, 216.
Khelat: *see* Kalat.
Kheri, 272.
Khirtar Range, 22.
Khoja caste, 139.
Khond tribe, 269.
Khowar language, 194.
Khulna, 110, 263.
Khurja, 159.
Khyber Pass, 277.
Killan, 327.
Kina Batanga River, 417.
Kinabalu, Mount, 415, 416, 418.
Kindat, 50.
Kinta River, 375.
Kistna, 280.
Kistna River, 5.
Klang River, 374.
Kodali (mattock), 121.
Kochhar Khatri tribe, 204.
Kohat, 277.
Kohistani language, 194.
Kol tribe, 207, 209, 217, 268.
Kolaba, 40, 283, 492.
Kolar, 140, 143, 234.
Kolhapur, 246, 284.
Konar tribe, 198.
Kondh tribe, 202, 207.
Konkan, 56, 65, 163.
Koppa, 66.
Korama tribe, 206.
Koran, 328.
Korati tribe, 206.
Korava tribe, 206.
Korea, 268.
Kosala, 227.
Kota Bharu, 461.
Kotah, 7, 64, 247, 490.
Kowloon, 439, 441.
Krian River, 374.
Krishna: *see* Kistna.
Krishnavakkar tribe, 203.
Kshatriyas, 213.
Kuala Lumpor, 461.
Kuantan River, 374.
Kuch Bihar: *see* Cooch Behar.
Kuching, 425, 427, 431, 433, 461.
Kuen Lun Mts., 30.
Kuki tribe, 215.
Kuki-Chin, language, 190.
Kulachi, 63.
Kuldevata, 229.
Kulin Brahmans, 204.
Kumaon, 15, 22, 28, 39, 271.
Kumhar (potter), 158.
Kuria Muria Islands, 284, 331.
Kurnool, 280, 282, 492.
Kurrachee: *see* Karachi.
Kurram, 277, 490.
Kurseong, 59.
Kurumba tribe, 198.
Kyaukse, 58.
Kymore Hills: *see* Kaimur Hills.

Labbais caste, 139.
Labuan, 374, 476; climate, 375; coal, 396, 432, 476; communications, 433, 476; fisheries, 398; harbour, 433; government, 424, 249; trade, 404, 405, 476; vegetation, 379.
Lac, 112, 155, 173.
Laccadive Archipelago, 281, 314, 315, 326; climate, 328; customs, 328; government, 328; population, 328; products, 328; public health, 328; religion, 328.
Ladak range, 29.
Ladang, 386.
Lagerstroemia, 380.
Lagoons, 315, 316, 327, 339.
Lahnda language, 195.
Lahore, 274, 276, 450, 489.
Lahul, 190.
Lake, Lord, 270.
Lakhimpur, 265, 487.
Lamaism, 234.
Lamma Island, 440
Landu, 319.
Langur, 95.
Lan-tao, island, 439.
Lao language, 192.
Lard: Hong Kong, 445.
Large Strait, 334.
Larkana, 283, 490.
Las Bela, 286.
Lashio, 289, 487.
Laterite: Ceylon, 342; India, 8, 9.
Laval, François Pyrard de, 320.
Lawa, tribe, 410.
Lawas River, 423.
Lead: India, 142, 144.
Leh, 54, 291, 489.
Leopard, 96.
Leprosy, 335, 329.
Lewa-Kanbis, 202.
Lieutenant-governor: India, 254.
Light, Francis, 406.
Lime, 150.
Lingayets, 215, 231.
Lingsugar, 66, 492.
Linseed, 130, 464.
Lion, 95.
Lisu tribe, 212.
Little Aden: *see* Jebel Ihsan.
Liukung, island, 448, 451.
Locusts, India, 110.
Lohar (blacksmith), 159.
Loharu, 276.
Lolo language, 190.
Lota, 160.
Lucknow, 100, 156, 158, 271, 272, 458, 488.
Ludhiana, 152, 156, 275.
Lu Hkun language, 192.
Luni River, 13.
Lushai Hills, 265, 487.
Lushei tribe, 207, 210, 212, 213, 215, 216.
Lyall, Sir Alfred, 293.
Lyallpur, 275, 489.
Lyeemun channel, 443.
Lynx, 95.

Macdonald, Mount, 448.
Maclear Deep, 435.
Madhvas tribe, 210.
Madhyadès, 195.
Madras (city), 280, 458, 466, 492.
Madras Presidency, 249, 280, 463; administration, 255, 281; agriculture, 122, 127, 131, 133, 135, 463; climate, 43, 50, 51, 55, 57, 65, 67, 70, 492; customs, 197, 203, 208, 210, 212, 214, 215; geology, 35, 37; gold, 35; history, 244, 245, 252, 280, 367; industries, 141, 153, 157, 163; irrigation, 117, 126; labour, 120; land tenure, 118; minerals, 143, 145, 147, 465; population, 470; ports, 170; religions, 207; soil, 115.
Madura, 67, 133, 155, 281, 352, 458, 492.
Magar, 108.
Magasi language, 193.
Mahanadi River, 5, 267.
Mahant, the, 228.
Mahaweliganga, River, 339.
Mahayana, school of, 234.
Mahé, 295.
Mahi Kantha States, 285.
Mahra tribe, 331, 336.
Mainpuri, 62, 272.
Maize: Brit. Malaya, 391; India, 122, 129, 173, 464.
Makalla, 330.
Makrai, 279.
Makrani language, 193.
Makum, 148.
Malabar, 281; climate, 45, 50, 56, 57, 115, 492; customs, 198, 204; population, 114; products, 133; relations with Maldive Archi., 320, 324; religion, 238, 239; vegetation, 77.

Malacca, 373, 377, 385, 402, 403, 408, 412, 461, 476.
Malacca River, 374.
Malacca, Straits of, 374, 375, 398.
Malaria, Hong Kong, 442; India, 114; Maldive Archipelago, 325.
Mala Vedar tribe, 210.
Malay Peninsula and States, 371; agriculture, 385; arts, 400; climate, 377; communications, 400, 401, 413; fauna, 347, 382, 418; fisheries, 398; government, 412; industries, 397; minerals, 144, 393; population, 409; products, 385, 388; railways, 402; relations with Great Britain, 407; religion, 411; rivers, 374; trade with Maldives, 324; vegetation, 379.
Malays, 408, 410, 481; Borneo, 434; Ceylon, 359, 475.
Malda, 263, 488.
Maldive Archipelago, 314; climate, 317; currency, 324; education, 324; fauna, 318; government, 319, 321; history, 318; language, 324; manufactures, 323; population, 324, 325; products, 323; public health, 325; relations with Britain, 326; religion, 318, 324; settlement, 322; trade, 323; vegetation, 317.
Malé, 319, 322, 323, 325.
Maler Kotla, 276.
Maliki, 238.
Malwa, 8, 135.
Mamalle of Cananore, 319.
Mamuti (mattock), 121.
Manbhum, 268.
Mandalay, 58, 154, 288, 289, 458, 487.
Mandi, 148, 198, 276.
Mandla, 64, 278.
Mangalore, 159.
Manganese, 144, 465.
Mangrove: Borneo, 417, 432; Ceylon, 346; India, 79, 83; Malaya, 382, 393; Maldive Archip., 317.
Manipur, 30, 154, 209, 248, 265, 487.
Manipuri tribe, 191.
Manipur-Lushei Hills, 202.
Mannar, 358, 367.
Maratha Jagirs, Southern, 285.
Marathas, 266, 269, 270, 278, 279, 283.
Marathi language, 195.
Mari language, 193.
Maria Gonds, 215.
Marip tribe, 202.
Markha, 216.
Markhor, 102.
Marmagao, 294.
Marmot, 100.
Marriage, in India, 309, 312.
Marring tribe, 209.
Martaban, 287.
Martaban, Gulf of, 33.
Martaban jars, 159.
Maru tribe, 216.
Marwar: *see* Jodhpur.
Marwaris, 139, 172.
Maskat, 330.
Masulipatam, 70.
Matale, 353.
Matou: *see* Port Edward.
Mathura: *see* Muttra.
Mauritius, 71, 174, 468.
Mawken tribe, 215.
Mayo Mine, 148.
Mayurbhanj, 247, 269.
Meerut, 272, 458.
Meghna River, 18, 51.
Meiktila, 288.
Meithei, 191.
Mekong, River, 32.
Melchior, Gonsalvo, 306.
Menarikam (marriage custom), 212.
Mercara, 56, 285, 492.
Mercury, 432.
Merwara, 273.
Mergui, 94, 487.
Metal-working, 159.
Metcalfe, Sir Charles, 270.
Mewar: *see* Udaipur.
Mianwali, 275.
Miao Yao languages, 189.
Mica: Ceylon, 342, 356; India, 147, 465.
Midnapore, 60, 263, 269, 488.
Mihintale Hill, 367.
Mikir tribe, 212, 216.
Milanau tribe, 410.
Millet, 116, 129.
Minbu, 58, 288.
Minikoi, 315, 321, 326, 328; government, 328; population, 328; trade, 329.
Minneriya, 355.
Miri, 432.
Mirs Bay, 439.
Mirzapur, 150, 156, 272, 458.
Missions, in India, 240; *see also* Christianity.
Mitacshara (school of law), 205.
Mobeds, 237.
Mody, Sir Hormusjee, 448.
Mogul group, 202.
Mohammedans: *see* Muhammadans.
Mokha, 333.
Moksha, 235.
Mon tribe, 410.
Mon Annam race, 410.
Monghyr, 159, 267, 268.
Mongmit, 289.
Mongoose, 97.
Monkeys, 94.
Mon-Khmer languages, 190.
Monsoon, 45, 67, 113, 116, 124, 343, 379.
Montgomery, 275.
Monywa, 33.
Moonstone, 343.
Moormen, 359, 363.
Mopillahs, 328.
Moradabad, 272, 459.
Moresby, Capt., 320.
Mosera, 330.
Mosquito, 318.
Motala Brahmans, 214.
Mouse-hare, 100.
Muar, 386.
Muar River, 374.
Muda River, 374.
Mudgere, 66.
Muhammad Imadudin, 320.
Muhammadans: in Borneo, 422, 429; Ceylon, 359, 363, 369, 476; India, 198, 202, 204, 210, 215, 238, 257, 286, 301, 309; Sarawak, 426.
Muka, Mount, 415.
Mukti, 226.
Multan, 62, 159, 275, 459, 489.
Munda languages, 196; tribe, 202, 207, 214.
Mungani language, 194.
Mungir: *see* Monghyr.
Munyal, 327.
Murray Hill, 435.
Murray, Sir John, 436.
Murree, 43, 54, 489.
Murshidabad, 59, 263, 488.
Murut tribe, 410, 421.
Muskrat, 99.
Muttra, 62, 227, 272.
Muzaffargarh, 62, 267, 272, 275.
Myelat States, 289.
Myingyan, 58, 487.
Myitkyina, 58.
Mylapore, 239.
Mymensingh, 18, 263, 488.
Mysore, 291; administration, 291; agriculture, 128, 134, 463; climate, 50, 51, 57, 66, 80; customs, 217; geology, 116; gold, 143, 465; industries, 140, 154; irrigation, 127; history, 280, 285; population, 246, 291, 470; religion, 231, 234.
Mysore (town), 292, 459.

Nabha, 276.
Nachchiyaduwa, 355.
Nadia, 231, 263.
Naga Hills, 265; language, 190; tribe, 200, 202, 207, 209, 213, 215, 217.
Nagar, 66.
Nagpur, 6, 279, 280, 459, 491.
Nagrakata, 59.
Nahan, 198.
Naini Tal, 24, 54, 271, 272, 489.

Nairs, 198, 328.
Nalgonda, 66.
Nallamalai Hills, 36.
Namakarma, rite, 206.
Nanak, 228.
Narbada: *see* Nerbudda.
Narbada River, 2, 4, 5.
Narkondam Island, 33.
Narsinghpur, 64, 279.
Nasik, 283, 491.
Navsari, 237.
Nayanagar, 274.
Nayar tribe, 232.
Neemuch, 64.
Negombo, 346, 358.
Negrais, Cape, 30.
Negri Sembilan, 373, 377, 412, 479.
Nellore, 57, 147, 280.
Nepal, 101, 175, 190, 234, 246, 290, 468.
Nerbudda Territory, 266, 271, 278.
New Conquests, 294.
New Territories, 439, 444, 485.
Nicobar Islands, 30, 249; administration, 289; customs, 208, 209, 215; history, 289; language, 190; trade with Laccadives, 329.
Nilgai, 103.
Nilgiri Hills, 3, 57, 79, 95, 134, 281, 492.
Noakhali, 263.
Non-regulation districts, 249.
North Cachar Hills, 19.
Northern Sirkars, 280.
North-West Frontier Province, 252, 271, 276, 463; administration, 277, 287; climate, 43, 45, 54, 63, 489; history, 277; population, 470.
North-Western Provinces, 266, 274.
Nowgong, 59, 64, 265, 487.
Nudiya: *see* Nadia.
Nurpur, 156.
Nutmeg, 388.
Nuwara Eliya, 343, 357.
Nuwarawewa, 355.

Oil: *see* Petroleum.
Oil-seed, 116, 117, 122, 130, 166, 173, 175, 464.
Old Conquests, 294.
Oman, Gulf of, 330.
Omar, 238.
One-and-a-Half-Degree Channel, 315.
Onge tribe, 202.
Ootacamund, 4, 57, 492.
Opium, 133, 173, 464, 467; legislation, 446, 452.
Orang utan, 383.
Oraons, 146, 202, 207, 210, 214, 216.
Orchha, 293.
Orissa, 269, 463; administration, 254, 269; climate, 45, 47, 50, 51, 60, 488; history, 265, 268; manufactures, 160; minerals, 144; religion, 236.
Oriya language, 195.
Osman, 238.
Otter, 99.
Oudh, 12, 120, 265, 270, 470; administration, 254, 272; history, 271; industry, 152: *see also* United Provinces.
Ounce, 95.

Pabna, 263.
Pachhango (marriage custom), 199.
Pachpadra, 64.
Pachusan, 235.
Pacific Ocean: coral reefs, 314.
Padi: *see* Rice.
Pahang, 373, 374, 375, 393, 402, 412, 479.
Pahang River, 374.
Pakokku, 33.
Palamau, 268.
Palanpur States, 285.
Palaung tribe, 199, 203, 209, 215.
Palghat Gap, 2.
Palghat River, 4.
Pali language, 190.
Palk's Strait, 339.
Palmyra palm, 353.
Pamir Mts., 30, 290.
Pancha sila, 234.
Panch Mahals, 283.
Panchpiriyas, 228.
Pangan tribe, 409.
Panipat, 195.
Panna, 7.
Pan-supari, 133.
Panther, 96.
Paper mills: Hong Kong, 445; India, 165.
Parachinar, 54, 490.
Parasnath, 236.
Parkar, 283.
Parsis, 139, 215, 237, 303, 305, 308, 333, 471.
Partabgarh, 272.
Partiala, 276.
Partition of Bengal, 266.
Pashin, 155.
Patana, 345.
Pataudi, 276.
Pathans, 202, 213, 277.
Patiala, 246, 489.
Patkabari, 59.
Patkoi Range, 19, 30, 33.
Patna, 61, 266, 267, 459, 488.
Pattu, 156.
Peak, the, 440.
Pearl: Ceylon, 349, 473; India, 149.
Pearson, Karl, 71.
Pegu, 287.
Penang, 373, 476; climate, 377; government, 412; history, 406; minerals, 395; population, 408, 478; trade, 387, 401, 404.
Penang (town), 402.
Penghulu, 426.
Penner River, 5.
Pepper: Borneo, 430; Malaya, 388, 483; India, 133.
Peradeniya, 344, 351.
Perak, 373, 375, 412, 479.
Perak River, 373, 374.
Peremul, 327.
Perim Island, 284, 330, 334, 472; climate, 330; government, 335; population, 335; vegetation, 334.
Perlis, 373, 377, 396, 482.
Perlis River, 374.
Permanent Settlement of 1793, 264.
Persia, climate, 72; language, 193; possession of Aden, 333; relations with Maldives, 319; trade with India, 155.
Persian Gulf, 330, 337, 338.
Peshawar, 43, 63, 159, 277, 459, 489.
Petroleum: Borneo, 432; India, 147, 465; Sarawak, 396.
Phoenicians, 333.
Phosphate Hill, 435.
Phosphate of lime, 396, 436.
Phulkari work, 156.
Phulkian States, 275.
Pidurutalagala, Mount, 339.
Pig: India, 105.
Pigafetta, 423.
Pilibhit, 62, 272.
Pineapple, 391.
Pir Panjal Range, 29.
Pisaça languages, 194.
Pisharotis, 215.
Pitti, 327.
Plague: Hong Kong, 442; India, 114, 311.
Plassey, battle of, 244, 296.
Plumbago, 342, 356, 473.
Pokuna, 366.
Polonnaruwa, 362, 365.
Police: India, 260.
Pomla tribe, 208.
Pondicherry, 130, 163, 295.
Pongyis, 215.
Poona, 131, 161, 283, 459, 491.
Popa, Mount, 33.
Porbandar, 150.
Porpoise, 105.
Port Arthur, 451.
Port Blair, 290, 306.
Port Edward, 449, 451, 452.
Port Swettenham, 405.
Portuguese: in Ceylon, 357, 364; Hong Kong, 446; India, 243, 294, 307, 319;

Indian Ocean, 339; Malaya, 403; possession of Aden, 333; Sokotra, 336.
Potato, 133.
Pottery, 158.
Prai River, 374.
Prain, Sir David, 80.
Prarthana Samaj (Inquiry Soc.), 304.
Pratiloma (custom), 203.
Precious stones: *see separate headings.*
Preparis Islands, 289.
Prince of Wales Island: *see* Penang.
Prome, 58.
Province Wellesley, 373, 377, 390, 402, 476.
Ptolemy, 318, 338.
Puddah River, 18.
Pudukottai, 282.
Pukhto dialect, 194.
Pulse, 116, 123, 129.
Pumice, 334.
Pundits, 231.
Punjab, 12, 13, 247, 274, 463; administration, 252, 254, 259, 275, 287; agriculture, 128, 130; cattle, 135; climate, 42, 45, 47, 50, 51, 55, 62, 80, 116, 489; customs, 198, 199, 204, 212; fauna, 94; history, 244, 271, 274; industries, 140, 152, 154, 156, 158, 159, 165; irrigation, 117, 124; language, 193, 195; minerals, 148, 465; mountains, 19; population, 470; religion, 231, 236, 238, 239; rivers, 17; trade, 172.
Punjabi language, 195.
Punti people, 446.
Purana system, 34.
Puraniya: *see* Purnea.
Puri, 269.
Purna River, 6.
Purnea, 60, 267, 488.
Pusa, 136.
Pushto language, 193, 194.
Putrika putra, 199.
Puttalam, 352.
Pwo language, 193.
Pyin tribe, 189.

Queen's College, Hong Kong, 447.
Quetta, 19, 56, 231, 286, 459, 490.
Quetta-Pishin, 286, 490.

Rabaris, 135.
Rabha tribe, 199, 207, 209.
Rabi (spring harvest), 117, 122.
Rae Bareli, 272.
Raffles, Stamford, 406.
Ragi (millet), 129, 464.
Railways: Brit. Malaya, 402, 480; Ceylon, 357, 473; Hong Kong, 445, 485; India, 114, 140, 168, 466.
Raipur, 279, 491.
Raja Chait Singh, 270.
Rajahmundry, 153.
Rajasthani language, 195.
Rajkot, 65, 491.
Rajputana, 247; administration, 274, 284, 292; agriculture, 121, 463; climate, 43, 45, 50, 51, 55, 63, 80, 490; customs, 202; fauna, 94; geology, 37, 39; history, 292; industries, 161; language, 195; minerals, 148, 149, 465; population, 113, 139, 470; products, 150, 155; religion, 236.
Rajputs, 119, 198, 202, 213, 214.
Rajshahi, 263.
Rakshasa (marriage custom), 213.
Rama cult, 227.
Rampur, 247, 273.
Rampur (town), 459.
Ramzan, 239.
Ranade, Mr. Justice, 304.
Ranchi, 61, 268, 488.
Rangoon, 100, 148, 169, 287, 288, 293, 460, 466, 487.
Rangpur, 263.
Rangrez caste, 155.
Raniganj, 159.
Ras-al-Hadd, 330.
Ras-el-Mandab, 334.
Ras Fastak, 329.
Ras Marbut, 332.
Ras Saukira, 329.
Ras Tarshein, 332.
Rat: India, 100.
Ratnagiri, 283.
Ratnapura, 358.
Rattan cane: Borneo, 430, 433; Malaya, 393.
Ravi River, 17, 274.
Rawalpindi, 43, 158, 275, 460, 489.
Rayatwari, 118, 280, 288.
Red Sea: trade, 330, 338.
Regulation districts, 249.
Regur, 8.
Reincarnation, belief in, 107, 226, 229.
Rejang River, 417, 419, 433.
Resident district officer, 249.
Resin, 430.
Revenue and Agriculture, Department of: India, 135.
Rewah, 7, 246, 293, 491.
Rhinoceros, 101.
Riang language: *see* Yin.
Ribut, 379.
Rice: Brit. Borneo, 422, 430; Ceylon, 350, 352, 355; Malaya, 385; Hong Kong, 444; India, 115, 117, 119, 122, 126, 127, 165, 173, 175, 463.
Rind language, 193.
Rodiya caste, 363.
Rodriguez, cable to Cocos-Keeling, 439.
Rohilkhand, 270, 273.
Rohri, 16.
Rohtak, 275.
Ronte tribe, 202, 212.
Roorkee, 62, 488.
Rosewood: India, 84.
Ross Hill, 435.
Ross, Capt. Clunies, 438.
Ross, Mr. Clunies, 436.
Ross, T., 406.
Royal Indian Marine, 200.
Rubber: Brit. Borneo, 430; Brit. Malaya, 386, 390, 392, 404, 405, 476, 483; Ceylon, 349, 351, 353, 358, 473.
Ruby: Ceylon, 343; India, 149.
Runn of Cutch, 12.
Russo-Japanese War, 451.
Ryotwari: *see* Rayatwari.

Sabaean language, 331, 336.
Sabaragamuwa, 360, 475.
Sadh tribe, 215.
Sadung River, 433.
Safed Koh Mts., 22.
Safflower (vegetable dye), 133, 155.
Sagaing, 58, 288, 289.
Sago, 431, 434, 483.
Saharanpur, 272, 488.
Sahjdharis, 236.
Sahyadri: *see* Ghats, Western.
St. Francis Xavier, tomb of, 229.
Saivas, 226, 228, 231.
Sakai tribes, 409.
Sakchi, 160.
Saket, 198.
Saktas, 228, 230.
Salem, 152, 210, 281, 460, 492.
Salsette Island, 283.
Salt, 148, 465, 473.
Saltpetre, 148.
Salt Range, 19, 36, 37, 148, 275.
Salwin River, 32, 192.
Samavartana rite, 207.
Sambhalpur, 60, 269, 488.
Sambhar, 104.
Sambhar Lake, 148.
Samha, 335, 337.
Samthar, 293.
Sandakan, 433, 461.
Sandalwood, 84.
Sandeman, Sir Robert, 286.
Sandur, 282.
Sankar Deb, 227.
Sankaracharya, 226, 231.
Sanjo River, 26, 29, 30.
Sannyasi (life of seclusion), 207.
Sannyasis, 215, 217.

Sansiya tribe, 202.
Sanskara rites, 206.
Sanskrit, 195, 196.
Santal, tribe, 146, 198, 202, 209, 210, 213, 215.
Santal Parganas, 252, 267, 269, 488.
Sapphire, 343.
Sapta padi (marriage rite), 211.
Saraikela, 268.
Sarak tribe, 234.
Saran, 60, 267.
Saraswati River, 14, 17.
Sarawak, 373, 415, 484; agriculture, 385; communications, 398, 403, 433; fauna, 418; government, 423, 424; minerals, 394, 396, 431, 484; native culture, 421; population, 408; products, 388, 393, 430; religion, 429; rivers, 417; trade, 401, 434, 484; vegetation, 380.
Sarkar (district), 249.
Sarwarias, 236.
Satara, 283, 492.
Sati, 309.
Satin-wood, 346.
Satnamis, 228.
Satpura Hills, 2, 4, 36, 43.
Saugor Island, 59.
Saugor Territory, 266, 271, 278, 491.
Sauras, 228.
Savantvadi, 284.
Sawntung Karen tribe, 202.
Sayed group, 202.
Scheduled Districts Act, 252, 286.
School of Oriental Languages, Calcutta, 303.
Sea Dayaks, 421, 425.
Secunderabad, 260.
Sedeli River, 374.
Selangor, 373, 375, 390, 405, 412, 479.
Selangor River, 374.
Semang tribe, 409.
Seo Narayanis, 215, 228.
Seoni, 64, 278, 491.
Serampore, 152.
Seremban, 462.
Serow, 103.
Sesamum, 130, 464.
Sgau language, 193.
Shafai, 238.
Shaikh group, 202.
Shaikh Othman, 331, 333.
Shahabad, 60, 267, 488.
Shahjahanpur, 272, 460.
Shahpur, 275, 489.
Shamanism, 233.
Shan Hills, 30, 31, 33.
Shan language: *see* Tai.
Shan States, 1, 31, 176, 288, 468; administration, 289; language, 191, 193; minerals, 144; population, 233.
Shantung, 448, 452.
Sheep, wild, 102.
Shevaroy Mts., 4.
Shiahs, 238.
Shikarpur, 16, 22.
Shik-pai-wan: *see* Aberdeen.
Shillong, 265, 487.
Shimoga, 66.
Shina language, 194.
Shola, 79.
Sholapur, 65, 283, 460, 491.
Shrimalis, 235.
Shwebo, 33.
Sialkot, 140, 159, 275.
Siamese language, 192.
Siamese-Chinese languages, 190.
Siamese art in Malay Pen., 400.
Sibi, 16, 19, 22, 490.
Sibpur College, 147.
Sibsagar, 59, 265.
Sigiriya, 367.
Sihut, 330.
Sikhism, 236, 471.
Sikh Wars, 274, 290.
Sikkim, 22, 190, 246, 290, 470, 472.
Silchar, 59.
Silk-weaving, 153.
Silk-worm: India, 111, 153; Wei-hai-wei, 450.
Silver, 142, 144.
Simbar, 294.
Singbhum, 268, 488.
Simla, 43, 54, 249, 274, 276, 489.
Sind, 11, 12, 22; administration, 283; agriculture, 123, 463; climate, 43, 45, 47, 50, 51, 55, 63, 68, 80, 115, 490; fauna, 94; history, 244, 283; industries, 159; irrigation, 126; population, 470; religion, 238; rivers, 16.
Sind valley, 6, 25, 28.
Sindia's dominions: *see* Gwalior.
Sindhi language, 195.
Singapore, 371, 373, 395, 476; climate, 377; government, 412; history, 406; industries, 397, 476; population, 407, 478; products, 391, 476; railways, 402, 476; trade, 387, 401, 403, 434; vegetation, 380.
Singapore (town), 402, 462, 476.
Singh Sabhas, 236.
Sinhalese, 318, 338, 340, 350, 352, 359, 360, 362, 369, 475.
Sirah: *see* Bab-el-Jehannum.
Sirkar, 229.
Sirmur, 276.
Sitapur, 272.
Sittaung River, 31.
Siva, 227.
Slate, 150.
Small Strait, 334.
Smarthas: *see* Saivas.
Snail, 349.
Snakes: Ceylon, 348; India, 108.
Society for Propagation of the Gospel, 429.
Sodre, Vicente, 319.
Sokiyar, 215.
Sokotra, 284, 335; ancient connexion with Africa, 335; climate, 335, 336; fauna, 336; geology, 335; government, 336; history, 336; population, 336; products, 336; religion, 336; trade, 330, 336; vegetation, 336.
Solu Islands, 421.
Solu, Sultan of, 422.
Somalis, in Aden, 333.
Son, River, 4, 6, 35.
Sonamarg, 28, 489.
Sonar (gold worker), 161.
South Africa: ancient connexion with Ceylon, 341; trade with India, 157.
Soy, 445.
Spinel, 343.
Squirrel, 100.
Sravaks, 234.
Srinagar, 54, 151, 460, 489.
Sringeri, 66, 231.
Sri Panchami, 230.
Sripujya, 235.
Sri Vaishnava, 210.
Steamer Point, 332.
Steatite, 150.
Steel, 160.
Stephano, Hieronimo di Santo, 319.
Sthanakavasi Svetambaras: *see* Dhundias.
Straits Settlements, 373, 476; administration, 429, 436; agriculture, 385; communications, 402; currency, 413; government, 411; history, 406; population, 139, 407, 411, 478; products, 388, 390, 476; trade, 133, 145, 153, 157, 174, 175, 403, 444, 468, 477; vegetation, 379; *see also* Singapore, Malacca, Penang, Province Wellesley, and Dindings.
Suba (province), 245.
Suez Canal, 333, 339.
Sugar: Brit. Malaya, 389, 476; India, 123, 130, 173, 175, 464.
Sugar-refining: Hong Kong, 444.
Suheli, 327.
Suket, 276.
Sukken, 16.

Sukkur, 283, 285.
Sulaiman Range, 19, 30.
Suleiman: reference to Maldives, 318.
Sultanpur, 272.
Sumatra, 289; affinity of vegetation with Cocos-Keeling, 382; emigration to Borneo, 421; trade with Brit. Borneo, 434.
Suddhi, 231.
Sunda: volcanic belt, 33.
Sundarbans, 14, 78, 115.
Sunnis, 238.
Sunyata, 234.
Surat, 139, 283, 460, 490.
Surguja, 268.
Sutlej River, 17, 29, 274.
Sutna, 64.
Suttee: *see* Sati.
Suvadiva, 315, 320, 323.
Svetambaras, 235.
Swadeshi agitation, 156.
Swat, 176, 277.
Sylhet, 59, 79, 238, 265, 487.
Syrian Christians, 239.
Szechuan, 190.

Tabu: Brit. Borneo, 420; India, 232.
Tai language, 192.
Taj Mahal, 150.
Talchir, 37.
Taliang Shan, 191.
Talikettu (marriage rite), 198.
Tamaru, Mount, 416.
Tamils, 338, 341, 350, 359, 360, 362, 365, 367, 369, 408, 475.
Tamlu Naga tribe, 215.
Tamrida, 336.
Tangalla, 352.
Tangasseri, 281.
Tanjong Pagar Dock Co. 404.
Tanjore, 281.
Tanks: Ceylon, 354; India, 127.
Tannah: *see* Thana.
Tanning, 157, 173.
Tapioca: Brit. Borneo, 431; Brit. Malaya, 388, 405, 476, 483.
Tapir, 101.
Taprobane, 318.
Tapti River, 5.
Taran tribe, 202.
Tata Company, 141, 160, 169.
Taungyi, 58, 289.
Taungthu tribe, 202.
Tea: Ceylon, 351, 353, 473; India, 117, 133, 173, 465.
Teak, 83.
Technical Institute, Hong Kong, 447.
Tehri, 273.
Teknonymy, 210.
Tenasserim, 31, 36, 45, 58, 94, 287.
Terai, 16.
Termite, 349.
Thana district, 283, 294, 492.
Thar, 283, 490.
Thayetmyo, 58, 487.
Thorianite, 342.
Thugs, 230.
Tian Shan Mts., 30.
Tibet, 30; customs, 215; fauna, 98, 102; geology, 36; language, 190; religion, 234; rivers, 26, 32; trade with India, 155.
Tibeto-Burman languages, 190, 196.
Tick, 111.
Tigaria, 234.
Tiger, 96.
Tiladummati-Milladummadula, 316.
Timbang River, 417.
Timber: Brit. Borneo, 417, 430; Brit. Malaya, 392; Ceylon, 345; India, 81, 165.
Tin: Brit. Malaya, 394, 405, 479, 482; India, 144.
Tinnevelly, 126, 281, 492.
Tippera, 263.
Tippoo, 291.
Tipura language, 191.
Tirah, 277.
Tirthahalli, 66.
Tobacco: Brit. Borneo, 390, 431; Brit. Malaya, 390; Ceylon, 353; India, 123, 133, 464.
Tochi Valley, 277.
Todas, 197, 198, 210.
Tonk state, 293, 490.
Tonti, 160.
Topaz, 343.
Tortoise, 108.
Tourmaline, 343.
Tranquebar, 294.
Travancore, 199, 210, 244, 246, 282, 353, 492.
Trichinopoly, 281, 352, 460.
Tringanu, 374, 405, 406, 482.
Tringganu River, 374.
Trincomali, 346, 358, 461.
Tri saranam, 234.
Trivandrum, 282, 492.
Tsanpo River: *see* Sanpo.
Tsingtao, 444, 451.
Tugalan, 386.
Tulsi Das, 225, 228.
Tungsten, 144, 479.
Turkey: possession of Aden, 333.
Turmeric, 155.
Turtle, 109.
Tuticorin, 367.
Twenty-four Parganas, 263, 488.
Tytam Bay, 443.
Tytam reservoir, 441.
Udaipur, 246, 268, 273, 292, 490.
Udayagiri, 236.
Umballa, 275, 276, 455, 489.
Umritsur: *see* Amritsar.
Unao, 272.
United Kingdom: trade with India, 160, 162, 175, 468.
United Provinces, 266, 270; administration, 252, 254, 271; agriculture, 123, 128, 130; climate, 45, 47, 50, 51, 53, 61, 80, 488; customs, 202, 210, 212, 215; history, 270, 271; industries, 141, 166; irrigation, 117, 124, 126; labour, 146, 164; population, 470.
Upanayana rite, 206.
Upper Sind Frontier, 283, 490.
Urial, 102.
Uva, 359, 360, 475.

Vaishnavism, 227, 228, 235.
Vaisya caste, 171, 139.
Vanaprastha (life of seclusion), 207.
Vasco da Gama, 243.
Vedas, the, 225.
Vedarambha rite, 207.
Veddahs, 340, 359, 475.
Viceroy: India, 256.
Victoria, 440, 441, 445.
Vihara, 366.
Vindhya Mts., 2, 4, 6, 243, 245, 278.
Vindhyan system, 7, 35.
Vishnu, 227, 228.
Vizagapatam, 249, 280, 282, 493.
Volcanoes, 33.

Wa language, 189.
Wady Hadramaut, 330.
Wallace's line, 418.
Waniya, 139.
Wano, 277, 489.
Wardha, 279.
Waziristan, 277.
Wei-hai-wei, 448; administration, 451; agriculture, 450; climate, 449; communications, 450; education, 453; fauna, 450; population, 451, 486; products, 450; revenue, 452, 486; rivers, 450; trade, 450, 486; vegetation, 450.
Wei-hai-wei (town), 451, 453.
Wellesley, Lord, 270.
Welsh Calvinistic Mission, 199.
Wen-chuan-tang, 452.
Weston, 433.
Whales, 105.
Wharton Deep, 435.

Wheat, 116, 117, 122, 128, 136, 173, 463.
Wild boar, 105.
Wolf, 97.
Wolfram: *see* Tungsten.
Wood-oil, 392.
Woollen industry, 155, 165, 175, 176.
Wootz, 143.

Yak, 101.
Yakha tribe, 215.
Yama, 234.
Yanam: *see* Yanaon.
Yanaon, 295.
Yandaboo, Treaty of, 265.
Yapahu, 367.
Yellow Sea, 448.
Yemen, 329, 333.
Yeotmal, 279, 491.
Yerukala tribe, 202.
Yodi-ela canal, 355.
Yoma, 289.
Young, Lieut., 320.
Yudgha language, 194.
Yunnan, 191.
Yusuf Shamsuddin, Sheikh, 319.

Zamindari, 118, 145.
Zanzibar, trade with Arabia, 336.
Zhob River, 16.
Zinc, 142, 144.
Zircon, 343.
Zoji La, 28.

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